

EXHIBIT 6

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REPORT ON

**POTENTIAL PRODUCTION OF BENZENE,
TOLUENE, AND XYLENE BY THE PETROLEUM
INDUSTRY**

Submitted By

Aromatics Subcommittee

To The

Aircraft Fuels Committee

Military Petroleum Advisory Board

Washington, D. C.

December 29, 1950

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CONFIDENTIALSUMMARY

In the event of an all-out war, a critical shortage of benzene, toluene and xylene aromatics would develop. While the actual requirements cannot be predicted accurately, the subcommittee assisted by PAD, has estimated from available information that sources other than coal tar would have to supply 4,000 barrels per calendar day (BCD) of benzene for essential chemical manufacture, 18,500 BCD of toluene for explosives and solvents, 25,000 BCD of aromatics for aviation gasoline (which to a large degree could be either toluene or xylene) and 4,300 BCD of xylene for solvents or a total of 51,800 BCD.

Following distribution of a letter to the Petroleum Industry, information was obtained on current actual production of aromatics, on increased production obtainable from existing plants with minor expenditures, and on further increased production by possible new plant construction.

Based on the replies received, the following tabulation has been prepared which indicates one manner in which the requirements could be met:

Demand:	BCD (a)			Steel, Thousands	
	Benzene	Toluene	Xylene	Dollars, Millions	Tons
Chemicals, Explosives, Solvents	4,000	18,500	4,300	—	—
Aviation Gasoline	—	6,000 (b)	19,000 (b)	—	—
Total	4,000	24,500	23,300		
<u>Production:</u>					
From existing plants with minor expenditures	3,035	6,995	7,900	5	2
Increase by addition of auxiliary units to existing plants	1,140	3,410	3,495	21	17
Further increase by constructing totally new plants	—	14,355	13,055	164	136
Total	4,175	24,760	24,450	190	155

(a) Basis 100% aromatic content.

(b) Arbitrary split of 25,000 BCD for aviation gasoline.

Three steps are indicated in the table to bring production up to the projected demand. The first step would involve minor expenditures at the existing plants in the estimated amount of \$5 million, would consume about 2,000 tons of steel and would require about a year for completion. The resulting facilities could be operated for maximum benzene to produce 3,035 BCD of benzene, 6,995 BCD of toluene, and 7,900 BCD of xylene. The second step would involve the addition of new feed stock

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fractionation and extraction units to synthesis plants in operation or under construction. This would require an estimated expenditure of \$21 million, and would consume 17,000 tons of steel. The increased production would be 1,140 BOD of benzene, 3,410 BOD of toluene, and 2,495 BOD of xylene. In the third step, totally new construction would be involved to the extent needed to meet the demand and would require both synthesis and recovery facilities. This step would provide 14,355 BOD of toluene, and 13,065 BOD of xylene, for which the expenditure is estimated to be \$164 million, and the steel requirement 134,000 tons. About two years time would be required to construct the equipment for steps two and three. Total production would be 4,175 BOD of benzene, 24,760 BOD of toluene and 23,460 BOD of xylene. It is estimated that the entire program could be carried out for a total expenditure of \$190 million for equipment, and a total steel consumption of 150,000 tons. An appreciable increase in production could be realized during the first year, and the entire program could be carried out before the third year of all-out war, at which time peak production would be needed. This production could be obtained using well-proven processes that have been in commercial operation for some time.

At least 75% of the benzene demand could be obtained from existing plants in a short time. However, at the expense of benzene production, the same facilities could be operated for maximum toluene to produce 415 BOD of benzene, 12,345 BOD of toluene and 5,835 BOD of xylene. This toluene production would amount to about 90% of the World War II capacity. The units could be operated for either maximum benzene or maximum toluene production, depending on the most urgent need at the time.

In the Summary table, it is indicated that present facilities with the addition of auxiliary units would provide the entire requirement of benzene. Actually these facilities, which were built for toluene during World War II, could be returned to that service and some of the new plants could be constructed primarily for benzene production.

The production figures, based on possibilities reported by the industry, are only approximate. While much information was obtained, the industry could not fully explore the field in the short time available. Several of the large companies have not yet reported regarding new construction and others covered only one of their several refineries. Continued development of the problem would doubtlessly reveal means of further increasing production from existing facilities and substantially increasing production by the addition of auxiliary units. Finally, potential production of concentrated aromatics by the construction of totally new plants would be many times greater than the totals shown above.

The production of aromatics to the extent indicated above should not significantly affect the production of other critical war

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products, except indirectly through the construction materials and labor requirements involved. The aromatics would be produced at the expense of motor gasoline, since practically all of the production could be drawn from naphthas that would otherwise be used for motor gasoline.

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INTRODUCTION

A shortage of aromatics of the types required by the Military will develop in the event of a war emergency. The maximum requirement would occur during the third year of all out effort. The requirements for the aromatics, which consist mainly of benzene, toluene, and xylenes, in relatively pure form, would exceed the present production capacity, and it seems likely that any substantial increase in capacity would have to be obtained from petroleum.

The Military Petroleum Advisory Board was requested to advise concerning the potentialities of the Petroleum Industry in meeting the shortage. In order to do this, an Aromatics Subcommittee to the Aircraft Fuels Committee was created. The subcommittee, functioning in a Government advisory capacity, consists of 16 members borrowed from the petroleum industry and related fields who, individually, were chosen because of their technical knowledge and background in the field of petroleum aromatics.

The Subcommittee was requested to prepare a general picture of the situation as rapidly as possible to indicate whether or not the petroleum industry had the potentialities to meet the aromatics shortage. This first report has been prepared with this objective in view, and as a result has been based on the somewhat limited data that could be assembled rapidly. It is possible that the figures on present production are low. It is known that the figures on potential production by new plant construction are low since it is evident that the industry could consider but a few of the possibilities in the time available.

REQUIREMENTS

Aromatics in relatively high concentration have the following essential uses:

(1) Essential Chemical Manufacture. This relates mainly to benzene needed for the production of chemicals for use in the manufacture of such products as synthetic rubber, plastics and resins, synthetic detergents, and aniline for various outlets including rocket fuel. The minimum requirement of benzene is estimated at 225 MM Gal/Yr. of which about 165 MM is currently producible from coal tar. There remains 60 MM Gal/Yr. equivalent to about 4,000 BCD, which it is assumed would be derived from petroleum.

(2) Explosives. This consists entirely in the need for high purity toluene for TNT manufacture. It is estimated that the total requirement would amount to 19,600 BCD, of which about 2,300 BCD could be obtained from coal tar, resulting in a demand of about 17,300 BCD from petroleum.

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(3) Aviation Gasoline. The use of relatively pure aromatics in the toluene-xylene range, as blending agents to impart rich mixture performance, allows the production of large volumes of aviation gasoline without seriously curtailing the normal operation of refineries to produce other essential petroleum products. It has been estimated that 25,000 BOD of aromatics are required, which could be either toluene, xylene, or blends of the two.

(4) Aromatic Solvents. Relatively pure aromatics in the toluene-xylene range are needed for solvents, particularly in surface coating application. It has been estimated that present requirements amount to 8,000 BOD, of which at least 50 percent, or 4,000 BOD are currently used in fields that would be considered essential. In the event of all-out war, the essential use would probably increase at least 50 percent for a total of 6,000 BOD. About 20 percent of this, or 1,200 BOD, would need to be toluene, and of the remaining 4,800 BOD of xylene, at least 500 BOD could be supplied from coal tar.

The aromatics requirements from petroleum are summarized in the following table:

AROMATICS REQUIRED FROM PETROLEUMExpressed as BOD of Pure Aromatics

	<u>Benzene</u>	<u>Toluene</u>	<u>Xylene</u>	<u>Total</u>
Essential Chemical Mfg.	4,000	—	—	4,000
Explosives	—	17,300	—	17,300
Aviation Gasoline	—	—	25,000(a)	25,000
Solvents	—	1,200	4,300	5,500
				<u>51,800</u>

(a) Total requirement of 25,000 BOD could be either toluene, xylene, or a blending of the two.

PROCEDURE

A letter of inquiry was prepared by the Subcommittee and forwarded on October 27, 1950, to 135 companies who operate petroleum refineries of 2,500 BOD or higher crude capacities, and to 10 process licensing companies. This questionnaire requested information concerning the immediate supply and long-range possibilities. By the end of November, approximately 100 replies had been received, which included substantially all the companies having crude capacity in excess of 50,000 BOD. The data presented have been tabulated, correlated, and analyzed by the Subcommittee and the results presented on the following bases:

- (1) Capacity for producing aromatics from petroleum during World War II.

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- (2) Present production of aromatics from petroleum, including a comparison with the war program.
- (3) Immediate maximum potential aromatics production obtained from units now operating, rehabilitation of idle equipment and bottleneck removal, including production differentials when operating for maximum benzene vs. maximum toluene.
- (4) New construction of feed preparation and extraction facilities required to recover fully aromatics from synthesis plants now in operation or under construction.
- (5) Construction of completely new facilities including synthesis and extraction units.

This report includes only summarized data. The replies to the inquiry and detailed data compilations are on file in the office of F&B.

Throughout the report all quantities have been expressed in terms of 100% aromatics content and the actual purities of the streams are indicated. Accordingly, the actual quantities of those streams less than 100% pure are greater by the impurity content.

PRODUCTION OF AROMATICS

World War II Program

The present production of aromatics by the petroleum industry is obtained almost entirely from plants that were constructed during World War II for the production of nitration toluene. At this time toluene was produced by (1) recovery from catalytically reformed naphtha; (2) isomerization and catalytic dehydrogenation of naphthenes from virgin naphtha; and (3) recovery from virgin and cracked naphtha. In most cases the toluene was recovered in high concentration by extraction with sulfur dioxide, extractive distillation employing phenol, or azeotropic distillation using methyl ethyl ketone or methanol. In one case concentration was effected by a second-pass hydroforming operation.

The largest volume of toluene was obtained by catalytic reforming (hydroforming) which produced, in addition to toluene, a concentrated aromatic fraction consisting primarily of xylenes, as a by-product. Eight such plants were constructed having a combined throughput of about 64,500 BOD of virgin naphtha and varying in size from 3,600 BOD to 2,000 BOD. These units with their extractive facilities produced about 10,200 BOD of toluene of which 95% was 99+ purity and 5% was 90+ purity, together with about 5,250 BOD of xylenes.

Two naphthene dehydrogenation units had a throughput of 6,000 BOD and produced about 1,510 BOD of toluene.

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Six extraction units were constructed for the recovery of toluene from virgin and cracked naphthas, with a total output of about 1,990 BCD of nitration toluene.

Total aromatics processing capacity during World War II, therefore, amounted to about 13,705 BCD of toluene and 5,250 BCD of xylenes. A tabulation of the plants involved in the toluene program, showing their capacities and production, is given in Table I.

Present Production

Since the war the emphasis has shifted both as to types and purities of aromatics. The shortage of nitration-grade benzene for chemical manufacture has resulted in the use of some of these toluene facilities for benzene manufacture. Increased demands for aromatic concentrates as solvents has brought about the diversion of some capacity to the manufacture of such products. Growing demands for Grade 115/145 aviation gasoline have occupied other capacity in the production of toluene and xylene concentrates of high rich mixture ratings. In all, about 75% of World War II toluene facilities are currently devoted to production of aromatic concentrates. The balance of the facilities are being applied to the improvement of motor gasolines or have been decommissioned.

The petroleum industry is currently producing the following amounts of concentrated aromatics in the benzene-xylene range:

	BCD Aromatics in Concentrates	Average Purity of Concentrates
Benzene	710	99+
Toluene	3,355	90
Xylenes (including associated ethylbenzene)	5,135	75
Miscellaneous aromatic concentrates of toluene and xylene	2,030	63
	11,230	85

Approximately 5,000 BCD of these aromatics are being used for solvents, a field which obtained practically no supplies from petroleum prior to World War II.

The present production of 11,230 BCD of aromatics averaging about 85% purity compares to the World War II output of 15,955 BCD of aromatics averaging about 96% purity. This reduction is due mainly to the following factors:

(1) There has been no need for maximum aromatics production. Therefore, even some of the facilities now in this service are operating

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at less than maximum output. Practically all operating units are processing only feed stocks from the associated refinery operations, whereas during the War supplementary feed stocks were brought in from outside sources.

(2) A greater variety of products is being made, which tends to decrease overall capacity. This seems to be particularly true where operating facilities designed for making toluene are now producing benzene.

(3) Lower purity products are being produced because requirements for current consumption are lower and in general the lower purity products are of lower cost.

Present production figures, listed according to companies and locations, are shown in Table II, and a list of the plants involved in the World War II program that are not contributing at present is shown in Table III. A comparison between present and World War II figures is summarized in Table IV.

Two of the eight hydroformers originally in the toluene program are no longer in aromatics concentrate service. A number of the remaining units are operating part-time for improvement of motor gasoline.

The naphthene dehydrogenation units are both in operation and are producing benzene and xylenes as well as toluene. The total aromatics production from these units is 1,110 BCD as compared to 1,510 BCD during the war.

One of the extractive units associated with a hydroformer producing aromatic concentrates is in distillation service and a number of others are operating at reduced capacity. None of the extraction units which formerly recovered toluene from straight-run and cracked naphthas are in this service and the resultant loss in toluene production is 1,990 BCD. In some cases these units could be reactivated.

Maximum Use of Existing Facilities

While full information is not yet available on all plants, it appears that aromatics production could be increased, beginning immediately and progressively growing over the next twelve months to the levels shown on Tables V and VI. Table V based on production of maximum toluene indicates a total aromatics production of 18,635 BCD while Table VI showing estimates of production if maximum benzene is desired, indicates a total of 17,930 BCD.

Comparing these lists of production facilities with those of World War II, one hydroformer and three "extraction only" plants have gone out of the aromatics picture. The Subcommittee understands that

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and hydroformer would require major repairs and new construction before it could be restored to operation; therefore, these facilities have not been included. Also three toluene extraction units are no longer capable of being restored to aromatics-purification service, eliminating these plants from the picture.

Referring to Table V, the estimated maximum production of nitration-grade toluene of 12,385 BOD is 1,320 BOD below the capacity during World War II. In realizing this maximum toluene capacity, it would be necessary to reduce current benzene production from 710 BOD to 415 BOD. If it were assumed that sufficient suitable stocks could be made available to fill all plants to capacity on toluene-making operations, the production of nitration grade toluene might be increased to about 13,000 BOD compared to 13,705 BOD during World War II. However, this would result in lowering current benzene production to 315 BOD.

Estimated production of 90+ purity xylenes is 5,815 BOD, which is 700 BOD above present output and about 600 BOD above the World War II production.

As shown in Table VI, it is estimated that existing plants could produce 3,035 BOD of benzene if this aromatic assumed primary importance, which is 75% of the estimated shortage. Toluene production would be reduced from 12,385 BOD as in the maximum toluene case, to 6,995 BOD or by 5,390 BOD. Production of xylenes would be increased by 2,065 BOD. This increase in "xylenes" results largely from the inclusion of some toluene in the xylene in this case.

In the event of an early situation requiring all-out production of aromatics, the ability of existing facilities to produce considerable amounts of benzene would very probably be valuable in helping to meet benzene requirements during the period when new facilities were being built, for presumably during that time requirements for nitration grade toluene will not have built up to a point where maximum toluene production is required. During this period benzene and toluene might compete for capacity within the approximate limits defined by Tables V and VI.

It appears that the expenditure required to put the existing plants in condition to produce maximum toluene or benzene would be less than \$5,000,000. Steel requirements are not expected to exceed 2,000 tons.

Potential Aromatics from New Construction

Many companies within the Petroleum Industry are considering or are willing to consider projects for the manufacture of aromatics that involve construction of new facilities. Most of the possible

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CONFIDENTIALTABLE IAPPROXIMATE CAPACITY FOR PRODUCTION OF AROMATICS FROM PETROLEUM--WORLD WAR II

<u>Hydroforming</u>		<u>Hydroformer Capacity-BCD</u>	<u>Recovery Method</u>	<u>Toluene</u>	<u>Xylene</u>
<u>Company</u>	<u>Location</u>			<u>Production BCD (d)</u>	<u>Production BCD (e)</u>
Humble	Baytown, Texas	21,000	SO ₂ Ext.	4,700	2,500
S.O. of Cal.	Richmond, Cal.	8,300 (a)	Expassing	1,030	140
S.O. (Ind.)	Whiting, Ind.	7,900	Phenol Ext.	1,450	695
Union	Cleum, Cal.	3,200 (b)	MX-Water	555	290
Pan Am.	Texas City, Tex.	6,400	Phenol Ext.	720	630
Pure Oil	Toledo, Ohio	4,700	" "	510	430
Continental	Ponca City, Okla.	3,600	" "	490 (d)	175
Texas	Lockport, Ill.	6,400	" "	720	170
		<u>64,300</u>		<u>15,595</u>	<u>5,250</u>

Dehydrogenation

Shell	Wilmington, Cal.	3,200	Phenol Ext.	910	---
Shell	Wood River, Ill.	2,800	" "	600	---
		<u>6,000</u>		<u>1,510</u>	---

Extraction from Virgin and Cracked Naphtha

		<u>Feed Source</u>		
Gulf	Phila., Pa.	Vir. & Cr. Naph.	Phenol Ext.	420
Magnolia	Beaumont, Tex.	" " "	Methanol Ext.	455
Shell	Houston, Tex.	Vir. Naphtha	Phenol Ext.	100
Shell	"	Vir. & Cr. Naph.	" "	225
Sinclair	Marcus Hook, Pa.	Vir. Naphtha	" "	220
Esso	Baton Rouge, La.	Cr. Cr. Naph.	" "	570
				<u>1,990</u>

Total Toluene 13,705
Total Xylene 5,250

(a) Total thruput 10,300 BCD. 2,000 BCD required for second pass.

(b) Total thruput 6,400 BCD. Unit operated 50% of time on other than aromatics production.

(c) Purity 99%

(d) Purity 90%

(e) BCD of aromatics content (assuming 90% aromatics concentration)

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CONFIDENTIALTABLE IIIUNITS OPERATING DURING WORLD WAR II, NOW PRODUCINGAROMATICS AT PRESENT

<u>Hydroformers</u>		<u>Hydroformer Capacity</u>	<u>World War II Production</u>	
			<u>Toluene BCD</u>	<u>Xylene BCD</u>
Union	Oleum, Cal.	3,200 BCD (a)	589	570
Texas	Lockport, Ill.	6,400 BCD	720	372
		<u>9,600</u>	<u>1,309</u>	<u>660</u>
<u>Extraction Units</u>				
Gulf	Philad., Pa.	--	420	--
Magnolia	Beaumont, Tex.	--	455	--
Shell	Houston, Tex.	--	100	--
Shell	"	--	225	--
Sinclair	Marcus Hook, Pa.	--	220	--
Esso	Baton Rouge, La.	--	570	--
			<u>1,990</u>	

(a) See note (b), Table I

TABLE IVCOMPARISON OF AROMATICS PRODUCTION CAPACITY DURING WORLD WAR IIAND PRESENT PRODUCTION

	<u>World War II</u>		<u>Present</u>	
	<u>BCD</u>	<u>%</u>	<u>BCD</u>	<u>%</u>
Benzene	--	--	710	99+
Toluene (High Purity)	13,215	99+	1,730	99
Toluene	490	90+	1,625	80
Xylene	5,250	90+	5,135	94
Aromatics Cuts	--	--	2,030	63
	<u>18,955</u>		<u>11,230</u>	

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CONFIDENTIALTABLE VESTIMATED PRODUCTION OF AROMATICS FROM PETROLEUMWITH MAXIMIZED TOLUENE PRODUCTION

(EXISTING PLANTS--REHABILITATED WHERE NECESSARY)

<u>Company</u>	<u>Location</u>	<u>Pentane</u> <u>SCD</u>	<u>Toluene</u> <u>SCD</u>	<u>Xylene</u> (90%) <u>SCD (b)</u>
<u>Hydroforming</u>				
Humble	Baytown, Texas	---	4,800	2,800
S. O. Cal.	Richmond, Cal.	---	1,030 (a)	146 (a)
S. O. Ind.	Whiting, Ind.	---	1,800	1,975
Pan Amer.	Texas City, Texas	---	570	600 (a)
Pure Oil	Toledo, Ohio	---	550	520
Continental	Ponca City, Okla.	100	315	200 (a)
Texas	Lockport, Ill.	---	720	500 (a)
<u>Dehydrogenation</u>				
Shell	Wood River, Ill. } & Wilmington, Cal.)	---	2,000 (a)	---
<u>Extraction from Virgin and Cracked Naphtha</u>				
Gulf	Phila., Pa.	---	200	---
Esso	Baton Rouge, La.	315	400	---
Total		415	12,385	5,835

(a) Estimated by Subcommittee
(b) X/GD of aromatic content

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CONFIDENTIALTABLE VIESTIMATED PRODUCTION OF AROMATICS FROM PETROLEUMWHEN MAXIMIZING BENZENE PRODUCTION

(EXISTING PLANTS—REHABILITATED WHERE NECESSARY)

<u>Company</u>	<u>Location</u>	<u>Benzene BOD</u>	<u>Toluene BOD</u>	<u>Xylene (80%) BOD (c)</u>
<u>Hydroforming</u>				
Exxon	Baytown, Texas	---	4,800	2,200
S. O. Cal.	Richmond, California	300	110 (a)	900 (a)
S. O. Ind.	Whiting, Indiana	750	---	3,000 (b)
Pan Amer.	Texas City, Texas	400	---	500 (a-b)
Pure Oil	Toledo, Ohio	---	350	500
Continental	Ponca City, Oklahoma	100	315	200 (a)
Texas	Lockport, Illinois	---	720	500 (a)
<u>Dehydrogenation</u>				
Shell	Wood River, Illinois and Wilmington, California	1,070	---	---
<u>Extraction from Virgin and Cracked Naphtha</u>				
Gulf	Philadelphia, Pennsylvania	---	200	---
Zeneco	Baton Rouge, Louisiana	415	300	---
		3,035	6,995	7,900

(a) Estimated by Subcommittee

(b) Mixed toluene-xylene containing approximately 80% aromatics.

(c) B/SD of aromatics content.

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Table VII

NEW CONSTRUCTION POSSIBILITIES REPORTED

Company and Location	Primary Processes and Charge (MCD)	Status of Process	Potential Aromatics (MCD)	Remarks
<u>Auxiliary Units</u>				
Atlantic-Philadelphia	Cat. Reform.	B	600*	900*
Aurora-Detroit	"	B	380	550
Midwest-Detroit	"	B	1,800	100
Old Dutch-Houston	"	A	1,700	375
Pan American-Texas City	"	A	6,470	1190
Premier-Longview	"	B	1,500	125*
Taylor-Port Isabel	"	B	3,600	220*
Subtotal			1140	3410
<u>Complete Plants</u>				
Atlas Pico-Shreveport	Extr. of Naphth.	A	420	
Citrus Service-Lake Charles	Cat. Reform.	C	1000	1750
" - East Chicago	"	C	580	850
Eastern States-Houston	"	C	420*	650*
Zaso St'd.-Baton Rouge	"	C	1800*	2250*
Midland-Cushing	"	C	1,400	125*
Hughes-Houston	"	C	1	75
Petroleum Spec.-Hastrop	"	C	900	125
Phillips-Burger	Therm. Crack.	C	2,270	30
	Fract., Isom.	C	2,800	
	1. Hydrocrack.	C	2,100	
	Dehydrogenation	C	8,500	
Shell-Houston	Isom-Dehydro.	C	16,000	710
" - Torco	"	C	6,800	(600) or 1150 (or 700)
Socomey-Basement	Cat. Reform.	C	15,700	(210) or 400 (or 250)
St'd. Calif.-El Segundo	"	C	8,900	1000
St'd. Ohio	"	C	15,000	900*
Sum Oil-Marens Brook	"	C	9,800	1350*
Subtotal			818	960
			8785*	1835*
From Existing Plants (Table VI)			3036	8992
NYAL			12260	26765

* Estimated by Subcommittee - production figures not given.
X - Under construction or authorized
C - Being considered

* Estimated by Subcommittee - production figures not given.

A - Existing
 B - Under construction or authorized
 C - Being considered

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Table VII

NEW CONSTRUCTION POSSIBILITIES REPORTED

Company and Location	Primary Processes and Charge (SD)	Status of Process	Potential Aromatics (SD)		Remarks
			Benzenes	Toluenes	
Auxiliary Units					
Atlantic-Philadelphia	Cat. Reform.	B	660*	990*	16,800*
Aurora-Detroit	"	B	380	310	285
Midwest-Detroit	"	B	1,600	100	
Old Ditch-Muskegon	"	A	1,700	375	
Pan American-Texas City	"	A	100	1190	990
Premier-Longview	"	B		125*	Differential production add. purif. facil.
Taylor-Port Isabel	"	E		320*	
Subtotal			1140	3410	2495
Complete Plants					
Atlas Proc.-Shreveport	Extr. of Naphth.	A	420		
Cities Service-Lake Charles	Cat. Reform.	C	1000	1750	5180
" - East Chicago	"	C	860	650	780
Eastern States-Houston	"	C	420*	650*	1090*
Zeno Std.-Baton Rouge	"	C	1800*	2280*	3750*
Midland-Cushing	"	C		125*	
Refined-Muskegon	"	C	75		
Petroleum Spec.-Viatron	"	C	125		
Phillips-Burger	Therm. Crack.	C	280	30	
	Fraction. Isom.	C			
	1. Hydrocycl.	C	710		
	Dehydrogenation	C		710	
Shell-Houston	Lean-Dehydro.	C	(900) or 1150 (or -750)		
Socomey-Basement	Lean-Dehydro.	C	(210) or 400 (or -260)		
Std. Calif.-El Segundo	Cat. Reform.	C	1000	2800	
Std. Ohio	"	C	1000	1350*	2250*
Sun Oil-Marcus Hook	"	C	818	860	3000
Subtotal			3035	13335	13055
From Existing Plants (Table VI)			3035	6092	1900
TOTAL			12280	24760	23460

* Estimated by Subcommittee - production figures not given.

A - Existing
B - Under construction or authorized
C - Being considered

CONFIDENTIAL

17

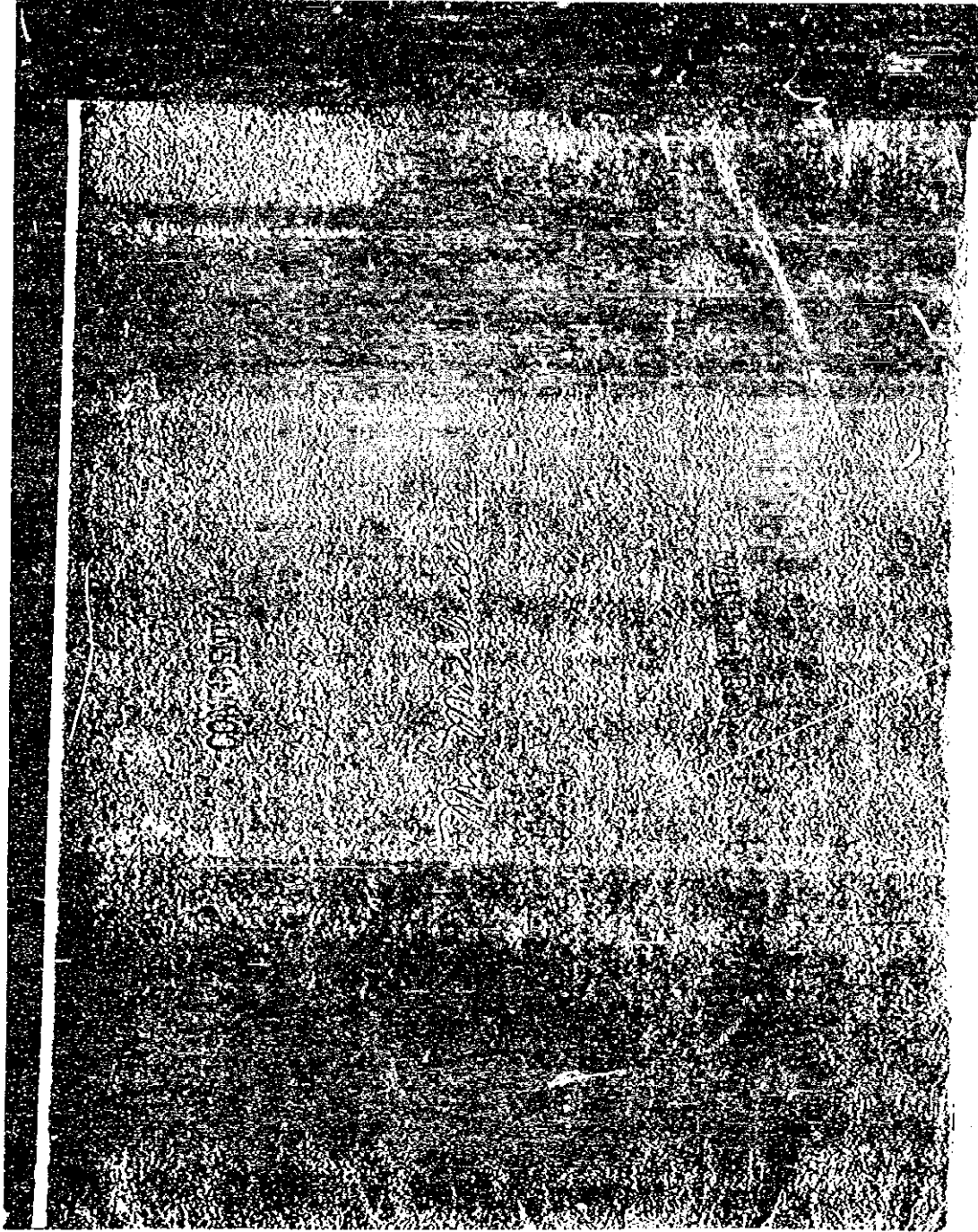
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JHM-0002-22 **



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002111

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EXHIBIT 7

HUMBLE OIL & REFINING COMPANY
HOUSTON 1, TEXAS

November 23, 1950

HINES H. BAKER,
PRESIDENT



In re: Production and Recovery
of Aromatics

RESTRICTED

Mr. H. A. Stewart
Acting Deputy Administrator
Petroleum Administration for Defense
Interior Building
Washington, D. C.

Dear Sir:

In a letter dated October 27, 1950, Mr. W. M. Holaday, Chairman, Military Petroleum Advisory Board, Aircraft Fuels Committee, asked certain information of us as to our immediate supply of aromatics and the long range possibilities of our increasing production of aromatics for use in critical products. The answers to the various questions asked by Mr. Holaday are set out in the attached memorandum of operations conducted at Humble's Baytown Refinery.

The estimates of production are based upon current crude runs of approximately 250,000 B/D and would, of course, be affected by changes in crude runs, in types of crudes processed, and in processing conditions which might vary from time to time. All of the aromatics currently being manufactured (except the 55% xylene hydroformate) is used in supplying commitments to customers for solvents and in increasing production of aviation gasolines both at our Baytown Refinery and at refineries of our customers. Further, approximately 600 B/D of cyclohexane is being sold under contract to a chemical company, which would be required to use benzene for manufacture of a critical product if the cyclohexane were not available.

In connection with the longer range possibilities of increasing aromatics production, the estimates of cost for facilities are tentative, and the indicated effect on aviation gasoline production has been shown on an industry basis, wherein it has been assumed that the rich mixture (3c) rating limits aviation gasoline production. Of the six possibilities listed, we are proceeding with the necessary work and acquisition of the facilities to obtain the results indicated under "Segregated Hydroforming of Coastal Naphtha," and "Hydrogenation of Hydroformate." Also, active study is being given to "Production of Incidental Xylenes" and "Installation of Additional Aromatics Extraction Capacity." In regard to the last two items shown -

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MISC-00005897

Mr. H. A. Stewart

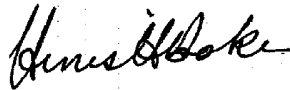
- 2 -

November 23, 1950

namely, "Production of 50% Benzene Concentrate," and "Recovery and Purification of Benzene and Benzene Producers from Existing Refinery Streams," the penalties to aviation gasoline production accruing to the operations mentioned appear too severe to warrant installation of facilities at the present time. Also, to the extent that cyclohexane can be used to displace benzene in the manufacture of critical products, it would appear more advantageous to consider a project wherein maximum cyclohexane would be recovered.

Please advise if we can be of further assistance in your work on this problem.

Very truly yours,



HAB.V.j

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R E S T R I C T E D

PRODUCTION AND RECOVERY OF AROMATICS
BAYTOWN, TEXAS, REFINERY OF HUMBLE OIL & REFINING COMPANY

1(a) Present Production

	Present B/CD
Solvent Toluene (98.5% purity)	1,500
Solvent Xylenes "	2,300
C ₉ Aromatic Solvent (Solvesso 100)	600
C ₁₀ Aromatic Solvent (Solvesso 150)	200
Toluene Concentrate (60-65% Purity) <i>Av.</i>	2,500
Mixed Toluene and Xylene Aromatics <i>Mater. (90% / 10)</i>	250
Aviation Xylene (90-93% Purity)	0
Xylene Hydroformate (55% Xylene) <i>Mater.</i>	2,900

Corrected by Group (1)

1(b) Possible Production

	Case I Max. Toluene from Present Crudes, B/CD	Case II World War II Basis, B/CD **
Solvent Toluene (Nitration Grade)	4,000	4,800
Solvent Xylene	0	0
C ₉ Aromatic Solvent (Solvesso 100)	0	0
C ₁₀ Aromatic Solvent (Solvesso 150)	0	0
Toluene Concentrate	0	0
Toluene Slop for Aviation	50	50
Aviation Xylene (90-93% Purity)	2,200*	2,200*
Xylene Hydroformate	0	0
Coastal Aviation Aromatics	0	0

Corrected by Group (2)

* Production of aviation xylene is contingent on either (1) use of refinery rerun equipment now in other services or (2) use of BOW towers which would reduce toluene production by about 350 B/D.

**Assumes importation of selected feed stocks similar to those in last war.

2. Types of Plants

- (a) Present plant consists of the former Baytown Ordnance Works which includes crude naphtha fractionating facilities, a 24,000 B/CD fixed bed Hydroformer, hydroformate fractionating facilities, and SO₂ aromatics extraction plant, aromatics acid treating and hydrolyzing facilities, and a product rerun unit.

- (b) Equipment which could be added

✓ (2) SO₂ Plant No. 1, which is now used for finishing 12,000 B/D of kerosene, could be used for production of 85% purity heavy aromatic solvents. Rehabilitation of an idle existing tower (ARU 4) and an additional furnace, tankage and lines would be necessary for this operation.

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R E S T R I C T E D

3. Feed Stocks

(a) Present

Feed Stocks to BOW

Average Light Crude Naphtha (Mid-Continent Type)
 Tomball Light Crude Naphtha (Aromatic Type)
 Coastal Light Crude Naphtha (Naphthenic Type)
 Total

Charge to BOW
 B/CD
 45,000
 7,800
 3,300
 56,100

Composition of Typical BOW Feed Stocks

Charge	<u>Yields, %</u>					
	<u>C4⁺</u>	<u>C5-200*</u>	<u>200-250</u>	<u>250-300</u>	<u>300-340</u>	<u>340⁺</u>
Light Crude Naphtha	4	28	23	20	17	8
Tomball Naphtha	4	22	25	23	17	10
Coastal Naphtha	4	20	27	26	13	10

Estimated Naphthene and Aromatic Content, %

Charge	<u>MCH</u>	<u>Toluene</u>	<u>C8 Naphthenes</u>	<u>Xylene</u>	<u>C9 Naph.</u>	<u>C9 Arom.</u>	<u>C10 Naph.</u>
Light Crude Naphtha							
200-250 °F	28	6 34	7	40			
250-300 °F			21	12	14		
300-340 °F					3	8	31
Tomball Naphtha							
200-250 °F	42	30 72	5	67			
250-300 °F			17	35	15		
300-340 °F					5	20	25
Coastal Naphtha							
200-250 °F	55	1 86	15	56			
250-300 °F			38	3	40		
300-340 °F					12	10	75

*This fraction together with 3,300 B/CD of C₅-200° light hydroformate is charged to the Naphtha Fractionating Unit for production of aviation base stock and 85% cyclohexane concentrate. These feed stocks contain the following quantities of benzene and benzene producers; however, facilities for their purification are not available.

<u>Component</u>	<u>B/CD</u>
Cyclohexane	1,400
Benzene	400
Methyl Cyclopentane	1,300

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R E S T R I C T E D

- (b) There are no feed stocks at Baytown other than those shown in 3(a) which are available for processing on existing equipment. Those stocks shown in 3(a) are already being used to supply solvents commitments and to maximize output of aviation gasoline.

4. Effect of increased aromatics production on production of other critical products.

In going from present production, as shown in 1(a), to possible operations with existing equipment, as shown in 1(b) as Cases I and II, the effect on production of solvents and Grade 115/145 Aviation would be approximately as follows.

<u>Delta Products</u>	<u>Item 1(b) Case I - Present Prod., B/CD</u>	<u>Item 1(b) Case II - Present Prod., B/CD</u>
Solvent Toluene	(1,500)	(1,500)
Nitration Toluene	4,000	4,800
Solvent Xylene	(2,300)	(2,300)
C ₉ Aro. Solvent (Solvesso 100)	(600)	(600)
C ₁₀ Aro. Solvent (Solvesso 150)	(200)	(200)
Equiv. Grade 115/145 Aviation	(300)	(300)*

*Does not include effect at outside plants from which feed stocks are imported.

Longer Range Possibilities

Some of the projects shown hereinafter and the indicated additional products which would be obtained from these projects are increments over the present production shown under Item 1(a). If operations were altered to produce the products shown under Item 1(b), this additional production may not be applicable. Some of the other projects are independent of the BOW operation.

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23
11

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R E S T R I C T E D

Included in Table 2

I. Segregated Hydroforming of Coastal Naphtha

1. This requires segregation and hydroforming of the 200-340°F fraction of Coastal naphtha. Segregated hydroforming rather than in admixture with poorer quality naphthas may permit including the C₅-300°F fraction of the hydroformate directly in aviation.

2. This project is awaiting the outcome of a plant test run planned for December, 1950.

3. The feed stock is 3,300 B/CD of virgin Coastal naphtha.

4. It is estimated that this project will produce 650 barrels per day of additional aviation aromatics having a 3-G index number (with 3 cc TEL) of 145-150.

5. Capital Investment - \$82,000 for 80,000 barrel tank and lines.

6. Steel requirements - 300 tons.

7. No change in utilities or chemicals would occur.

8. No additional labor would be required.

9. This project would be used only for the production of additional aviation aromatics.

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MISC-00005902

R E S T R I C T E D

Licked in Table 2

II. Hydrogenation of Hydroformate

1. Toluene, xylene, and the Solvesso solvents must be acid treated severely for final product quality. Pilot unit data have shown that hydrogenation of the total Hydroformer product in a fixed bed reactor using Shell 62 or BR 973 catalyst will reduce the unsaturate content sufficiently to eliminate acid treating of xylenes and the Solvessos and reduce appreciably the acid treat required for toluene.

2. Engineering work on this project is essentially complete, and the installation should be completed by about the middle of 1951.

3. See item 1, above.

4. Less severe acid treating of toluene and elimination of xylene acid treating will reduce losses of these aromatics to sludge and polymer by a total of about 120 B/CD; losses of Solvesso 100 and 150 will be reduced about 30 B/CD. In addition, it is planned to install a new furnace at an idle column to increase recovery of the Solvessos when acid treating of these stocks is eliminated; activation of this column will increase Solvesso production by 150-200 B/CD.

5. The capital investment for hydrogenation of hydroformate, including the purchase of catalyst, and for a new furnace for additional rerun facilities is estimated to be about \$700,000.

6. About 254 tons of steel will be required for a 250 psi working pressure, 10x15 foot reactor, lines, and a 25 million Btu per-hour furnace.

7. The initial catalyst charge required for this project will amount to 70,000 pounds of Shell 62 or BR 973 hydrogenation catalyst. Utilities consumption will be increased by that required for operation of the additional rerun column. Sulfuric acid and caustic soda consumption will be reduced by 53 and 5 tons/CD, respectively.

8. No significant increase in operating or maintenance labor will occur.

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R E S T R I C T E D*Included in Table 2***III. Production of Incidental Xylenes**

1. This project involves installation of additional fractionating facilities to segregate 260-300°F boiling range virgin naphtha from the present Hydroformer feed so that approximately 260°F end point naphtha, containing the majority of the C₈ naphthenes, can be hydroformed separately for the production of xylenes which can be recovered in purities of 90-93% by simple distillation. The 260-300°F boiling range naphtha would be hydroformed in a separate operation to produce xylenes for SO₂ extraction.

2. This operation was performed during World War II. Process design and economics of this operation have not yet been prepared.

3. This operation entails no change in overall Hydroformer feed stocks, but merely provides for more efficient utilization.

4. This project would produce approximately 1,500 B/CD of 90-93% purity xylenes having a 3-C Index Number with 3.0 cc TEL per gallon of 165-170. This production would be obtained at the expense of the 55% purity xylene hydroformate shown in item 1(a) and represents an addition to the high purity aromatics shown in this item; but it is interchangeable with the high purity xylenes shown in item 1(b).

5 & 6. No estimates of the cost of this project have been obtained. One installation, requiring about 770 tons of steel includes one 50 plate, 12 foot diameter, furnace reboiled fractionator, additional tankage and lines. However, a smaller and higher cost increment of aviation xylenes could be produced without installing the new tower, thereby reducing the steel requirement to about 245 tons. The new lines and tankage required for this operation are estimated to cost about \$100,000. Approximately 460 B/CD of aviation xylenes, equivalent to an additional 750 B/CD of Grade 115/145 Aviation, could be produced without the new tower; however, this would result in a severe penalty in motor gasoline production, making the cost of the additional xylenes high. This high cost could be avoided and the production rate could be increased to 1,500 B/CD by installing the new tower.

7 & 8. No additional chemicals or catalyst would be required. Utilities and operating and maintenance labor would be increased by the amount necessary for one additional fractionator and the additional tankage.

9. Flexibility has been indicated under item 4, above.

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RESTRICTED

Included in Table 2

IV. Installation of Additional Aromatics Extraction Capacity

1. As an alternative to production of additional 90-93% purity xylenes for aviation gasoline, facilities could be installed to upgrade these xylenes to solvent purity. Additional extraction facilities might consist of (1) expansion of the present No. 2 SO₂ Plant, (2) installation of a new SO₂ plant, or (3) installation of a phenol extractive distillation unit which would process toluene, thereby releasing SO₂ plant capacity for additional xylenes. Capacity could be provided in this extractive distillation unit to process benzene recovered from present streams or produced by hydroforming selected feed stocks.

2. Studies have been initiated recently to determine the relative economics of the above alternatives as well as to establish the applicability of benzene purification by SO₂ extraction.

3. The net feed stocks for additional extraction capacity would consist of approximately 2,900 B/CD of 55% purity xylene hydroformate, however, as mentioned above, the actual feed to the new unit might consist of toluene now charged to SO₂ extraction, which would release SO₂ plant capacity for processing the xylenes. The new unit might also charge benzene feed. Approximately 320 B/CD of a 50% benzene concentrate feed could be produced with existing fractionating facilities; this is discussed under item V.

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MISC-00005905

RESTRICTED*Included in Table 2*

V. Production of 320 B/CD of 50% Benzene Concentrate

1. This product could be recovered in existing fractionating equipment from light hydroformate. Production of higher purity by distillation is not possible due to presence of azeotropes, and SO₂ extraction is not practicable in the existing plant.

2. Test production has been demonstrated in the plant; however, installation of pumps, lines, tankage, and loading facilities would be required for regular production.

3. This benzene would be produced from light hydroformate now being processed for aviation base stock production.

4. The net change in critical products accompanying production of benzene concentrate would be as follows:

<u>Net Product</u>	<u>B/CD</u>
50% Purity Benzene	320
Grade 115/145 Aviation	(450)

5. The investment for storing and shipping benzene concentrate is estimated to be approximately \$100,000.

6. About 270 tons of steel would be required for two 10,000 barrel atmospheric storage tanks and approximately 10,000 feet of 4-inch pipe.

7. Only normal utilities would be required for this project.

8. Only normal operating and maintenance labor would be required for this project.

100,000
160
124 = *625*

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MISC-00005906

RESTRICTED*Included in Table 2*

VI. Recovery and Purification of Benzene and Benzene Producers from Existing Refinery Streams

1. All 200°F. end point virgin naphthas and the 200°F. end point light hydroformate are segregated and charged to a super fractionating unit for production of aviation base stock; 600 B/CD of an 85% purity cyclohexane are also produced from these feed stocks. These feed stocks contain the following approximate quantities of hydrocarbons which might be produced in one stream as feed stock for a purification unit to supply high purity selected raw stocks for benzene manufacture.

Component	B/CD
N-Hexane	2,600
Methyl Cyclopentane	1,300
Dimethyl Pentanes	400
Benzene	400
Cyclohexane	1,400
Total	6,100

Table 2

It is possible that the methyl cyclopentane, benzene, and cyclohexane could be recovered as separate streams in good yield and high purity by a combination of extractive and azeotropic distillation. It is understood that high purity cyclohexane can be substituted for benzene in the manufacture of critical chemicals. The methyl cyclopentane could be isomerized to cyclohexane which could be converted to benzene if cyclohexane were not needed.

It is believed that segregating and processing these hydrocarbons separately might be preferable both from the standpoint of maximizing benzene production and in producing benzene at minimum cost. For example, the benzene equivalent in the above stream, assuming complete conversion of the naphthenes, would amount to approximately 2,600 B/CD. On the other hand, if the above stream were hydroformed, total benzene production would amount to only 1,400 B/CD (only slightly greater than the benzene equivalent of the cyclohexane and benzene contents) principally because of the low yield obtained from methyl cyclopentane. Moreover, such an operation in existing hydroforming facilities at Baytown would reduce production of other aromatics and aviation gasoline drastically.

2. An exploratory investigation of processes to recover the above hydrocarbons in high purity is contemplated.

3. See item 1.

4. If the above quantities of methyl cyclopentane, cyclohexane and benzene were segregated and processed in an optimum manner to obtain the ultimate potential yield of benzene, it is estimated that production of Grade 115/145 Aviation gasoline would be reduced by approximately 2,000 B/CD, and the production of 85% cyclohexane concentrate by 600 B/CD.

5, 6, 7, 8. Information is not available.

9. This project would not affect toluene or xylene production.

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MISC-00005907

R E S T R I C T E D

VII. Thermal Aftertreating of Catalytic Naphtha

1. Catalytic naphtha could be thermally aftertreated, acid treated, and rerun to produce high purity xylenes for aviation gasoline.
2. Operability of this process was demonstrated in World War II. Thermal cracking facilities are available at Baytown, but lines, tankage and finishing facilities are not available. No work on this is being done at the present time.
3. 3,500 B/CD of catalytic naphtha are available for thermal aftertreating.
4. This project would increase Grade 115/145 production by an estimated 3,500 B/CD, provided that 3-C rating limited Aviation gasoline production.
- 5, 6. Information not available.
- 7, 8. Utilities consumption would be increased by the equivalent of four thermal cracking units, as would operating and maintenance labor. Sulfuric acid requirements for treating the cracked product would amount to approximately 15 tons/CD.
9. This project would not affect other aromatics production.

R E S T R I C T E D

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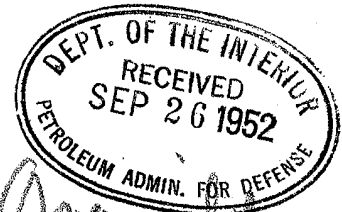
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EXHIBIT 8

HUMBLE OIL & REFINING COMPANY

HOUSTON 1, TEXAS

September 25, 1952

HINES H. BAKER,
PRESIDENT

Mr. J. Ed Warren
Deputy Administrator
Petroleum Administration for Defense
Washington 25, D. C.

Dear Ed:

Since our telephone conversation of September 17, in which you pointed out that ASPPA is short about 15,000 B/D of aviation gasoline over the next five months, we have reviewed projected operations at our Baytown Refinery and wish to report that we plan to operate all of our aromatics-producing equipment at capacity. Further, return to service of our No. 1 Catalytic Cracking Unit should make available sufficient olefins and isobutane to load our Alkylation Plant to capacity. Unfortunately, this plant is currently limited by the downtime of a centrifugal compressor, the turbine drive of which has been returned to the Terry Steam Turbine Company for repairs. Since that Company is on strike, it is not known when the repaired turbine will be returned; meanwhile, aviation gasoline production equivalent to about 600 B/D of Grade 100/130 is being lost. The Terry Company has advised that it cannot move the turbine from the struck plant even though it might be repaired elsewhere. Despite this, we plan some test work at the Alkylation Plant within the next few weeks to determine after adequate olefin supplies are available whether additional alkylate might be produced even at some sacrifice in quality. We will, of course, revise production estimates reported to you regularly if such test work indicates a substantially higher production to be possible.

We have investigated the possibility of obtaining field natural gasoline for superfractionation on existing equipment to increase supplies of isopentane, isohexane, and isoheptane. Sale of these premium base stocks to Esso Standard Oil Company has been discussed, since we understand that that Company is using a much poorer aviation base stock in its aviation gasoline blends. The production of the superfractionated base stock and its purchase by Esso Standard and subsequent blending at one of the Esso Standard refineries entail additional costs but should increase aviation gasoline production by about 500 B/D of Grade 100/130. We understand that Esso Standard plans to discuss sale of the additional gasoline to ASPPA with PAD.

Laboratory work is being done to determine whether a better than marginal quality aviation base could be produced by acid treating and rerunning light catalytic naphtha. Based upon our experiences during the last war, it appears that a 120 index number base stock might be produced by this method.

We wish to point out that every effort is being made to maintain our aviation gasoline producing facilities at capacity, but we will continue to study the problem of making additional quantities and advise you of any noteworthy developments.

Very truly yours,

HHB.j

NARA CP
RG 312, Entry 1
Box 52

US-BT011987

EXHIBIT 9

RCM
 ② * ③

Esso

4/27

Neal

1. Mr. [unclear]
 2. P.A.D. [unclear]

ESSO STANDARD OIL COMPANY

15 WEST 51ST STREET

NEW YORK 19, N. Y.

STANLEY G. HOPE
 PRESIDENT

November 13th, 1950.



Mr. H. A. Stewart,
 Acting Deputy Administrator,
 Petroleum Administration for Defense,
 Interior Building,
 Washington, D.C.

Dear Mr. Stewart:

In Mr. W. M. Holaday's letter of October 27, 1950, entitled "Production and Recovery of Aromatics", he presented a Questionnaire from the Aircraft Fuels Committee of the Military Petroleum Advisory Board, requesting information from the Esso Standard Oil Company concerning their present and potential plans for providing aromatics.

Concerning the immediate supply picture, this Company has no production facilities, and we do not believe that facilities could be made available for aromatics production recovery without major construction. We do have potential feed stocks containing aromatics, which could possibly be made available for processing elsewhere. However, appreciable expenditures might be required for the fractionation of these various feed streams to obtain suitable concentrations for shipping to others. The situation concerning the feed stocks is briefly as follows:

Approximately 3,000 B/D of clay treated naphtha containing about 450 B/D of benzene and almost 500 B/D of toluene could be made available. Seventy-five per cent of this stream would be obtained at the expense of motor gasoline production, and the remaining 25% would be obtained at the expense of raw chemical feed stocks being processed by companies other than our own for the manufacture of petroleum resins. If the various streams involved in our refinery were fractionated with different cut points, it would be possible, by increasing the distillate quantity to some 3,850 barrels, to include about 350 B/D of C₈ aromatics. The C₈ aromatics are estimated to have analyses approximately as follows:

Include
 in
 2

	Volume %
Ethyl Benzene	20
Metaxylene	40
Orthoxylene	15
Paraxylene	25
	100

No detailed engineering has been carried out concerning the fractionation facilities required to make these distillate streams available, but preliminary estimates indicate the following requirements at our Baton Rouge plant:

Investment	Approx. \$425,000
Steel	" 600 tons
Steam	" 400,000 lbs./day
Electricity	" 1,000 KWH/day
Other Utilities	Negligible
Operating & Maintenance Labor	4 men

Mr. H. A. Stewart

November 13th, 1950

Under the section in the inquiry concerning longer range possibilities, we would like to advise that we are actively considering a project for the recovery of all of the benzene and most of the toluene from the steam cracked distillate streams described above. A C_6 to C_7 fraction would be prepared, containing about 450 B/D of benzene and about 320 B/D of toluene. The toluene production would be limited to the capacity of the facilities which would be reconditioned for this operation. Incidentally, these facilities include the idle Toluene Plant, Plancor 1065, which was constructed by the Government during the last war and recently purchased by Esso. The C_6 and C_7 stream would be extractively distilled, using phenol in a blocked operation to recover about 415 B/D of styrene-grade benzene and about 300 B/D of nitration-grade toluene. As mentioned above, the feed stock is currently directed to motor gasoline, and the by-product from the aromatics extraction would be returned to motor gasoline so, in general, the effect of the aromatics recovery would be to reduce motor gasoline by the amount of the toluene and benzene removed plus the loss associated with the removal, as well as possibly to cause some degradation from motor gasoline to lower value materials. The requirements for this project would appear to be about as follows:

Investment, including off-sites	\$1.7 MM
Steel Requirements	600 tons
Chemicals:	
Sulphuric Acid	9 T/D
Caustic	0.4 T/D
Phenol	2700 lbs./D
Utilities:	
Dowtherm	300 lbs./D
Steam	1300 lbs./D
Electricity	2100 KWH/D
Fuel	2250 MM BTU's
Operating & Maintenance Labor	65 Men

415

Included
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Table
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Adequate tankage is contemplated so that blocked operation of the extraction unit may be carried out, which should allow the flexibility to switch between benzene and toluene.

We are also considering a project for the production of aromatics on a much larger scale. However, this project has not been sufficiently engineered to advance any specific information at this time. We will be glad to forward this information when it becomes available. Suffice it to say, our thoughts have been directed towards a catalytic reforming project, feeding 25,000 B/D of naphtha and producing about 5,500 B/D of aromatics, distributed somewhat as follows:

Benzene	20%
Toluene	50%
Xylenes	30%

Table
3

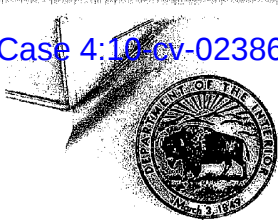
Yours very truly,

A.C. Hope Jr.

RMJ:OE

- 2 -

EXHIBIT 10



UNITED STATES
DEPARTMENT OF THE INTERIOR
PETROLEUM ADMINISTRATION FOR DEFENSE
WASHINGTON 25, D. C.

011-3
mayhew

January 26, 1954

Memorandum

To: Secretary of the Interior and
Petroleum Administrator for Defense

From: ~~Mr.~~ Joseph A. LaFortune, Deputy Administrator

Subject: Report on the Petroleum Administration for Defense

Attached for transmittal to the ~~Joint Committee on~~
Defense Production is a report on the Petroleum Administration
for Defense covering the fourth quarter of 1953, together with
a general review of PAD's activities to date, as requested by
the Joint Committee on Defense Production.

The report was prepared in accordance with Senator
Capehart's letter of August 6, 1953, to you, and Under Secretary
Tudor's reply of August 24, 1953, to Senator Capehart.

Joseph A. LaFortune
Deputy Administrator

Attachment

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113.4*



UNITED STATES
DEPARTMENT OF THE INTERIOR
PETROLEUM ADMINISTRATION FOR DEFENSE
WASHINGTON 25, D. C.

6/11.3

The final quarter of 1953 saw the revocation of the last of the orders of the Petroleum Administration for Defense and the beginning of preparations for termination of the agency itself and initiation of planning for transition to the regular Oil and Gas Division, the permanent oil and gas agency in the Department established to deal with peacetime problems of national importance. This Division also will continue necessary defense mobilization activities under the Defense Production Act.

These developments were a natural outgrowth of the general and substantial strengthening of the oil and gas supply position of the United States that has been going on continuously since the outbreak of hostilities in Korea in mid-1950 and the establishment of PAD on October 3 of that year.

Last of the PAD orders to be dropped--there have been only six, all told--was Order No. 3, which required that alkylate, a highly specialized component of gasoline used to increase octane rating, be used only in the production of aviation gasoline and that feed stocks suitable for the manufacture of alkylate be used only for that purpose. The order, originally issued on October 19, 1951, was canceled effective December 1, 1953.

Crude productive capacity (including natural gas liquids) has been increased by well over one million barrels a day, rising from the 1950 average of 6,980,000 barrels a day to 8,159,000 in January, 1953. It was boosted still higher during 1953.

Natural gas utility sales increased from approximately 3,658 billion cubic feet in 1950 to an estimated 5,200 billion cubic feet in 1953.

To summarize, in the 3½ years since its establishment, the Petroleum Administration for Defense has made major defense studies for the National Security Council and has aided in carrying out expansion programs resulting from those studies; it sponsored the establishment of the Foreign Petroleum Supply Committee and has supervised its activities, including the plan of action which played a vital part in keeping the Free World adequately supplied with petroleum products after the shut-down of the world's largest refinery in Iran; during the period of the Controlled Materials Plan it assisted the oil and gas industries, domestic and foreign, in obtaining vast quantities of needed materials and equipment; it has handled approximately 2,000 applications for accelerated tax amortization in connection with defense projects.

With ample production now to meet all requirements, both in the United States and the Free World, much of PAD's work has been completed.

The over-all defense policy of this Nation requires the maintenance of productive capacity in a state of constant readiness and at a level sufficient to meet defense needs. This basic policy requires not

only a completion of the expansion to meet mobilization goals but also to maintain the productive capacity sufficient to meet the normal increase in the domestic economy, at the same time maintaining an appropriate reserve capacity. To assure the necessary expansion and maintenance requires the continuation of the close Government-industry cooperation which has been so effective during the past three and one half years. This close cooperation will be maintained during the remaining life of PAD, and it must be continued by its successor agency.

One of PAD's important responsibilities is in the defense mobilization expansion of facilities needed to meet the Nation's estimated mobilization requirements of oil and gas. Excellent progress has been made for attaining this objective although many projects, particularly in refining and alkylation, initiated under the program will not be completed until some time during the calendar year 1954 or 1955. Additional expansion is still needed and is under way. PAD continues to handle approximately 20 applications per month for certificates for accelerated tax amortization. These require analyzing by technical experts with appropriate recommendations to the Office of Defense Mobilization.

During the third quarter of 1953, PAD began to explore the possibilities of interesting private industry in the construction of additional pipe line capacity from the Texas-Gulf area to the East Coast as insurance against loss or impairment of crude oil tanker service in the event of war. This study, undertaken at the request of

the National Security Council through the Office of Defense Mobilization, was one of PAD's major uncompleted tasks as 1953 ended.

PAD has been advised that it will be asked by ODM, again acting for the National Security Council, to undertake a general strategic review of the oil and gas supply-requirements position of the United States on the order of similar studies made by PAD during the Korean emergency.

Under the plans being formulated to restore the Oil and Gas Division to full operating status in the Department of the Interior in order to maintain continuity on petroleum and gas matters of vital concern to the Government, the Division also will be geared to assume any remaining defense responsibilities. Since establishment of PAD, the Oil and Gas Division has been concerned principally with administration of the Connally "Hot Oil" Act. The present plans include continuation of the National Petroleum Council, the Gas Industry Advisory Council and the Foreign Petroleum Supply Committee, and reactivation of the Military Petroleum Advisory Board. Members of both the National Petroleum Council and the Gas Industry Advisory Council have been appointed by the Secretary of the Interior for 1954.

Under the Oil and Gas Division all necessary information and advice on oil and gas regarding both the domestic and Free World supply and demand will continue to be readily available to the Government, and the Government will have the necessary machinery to deal with any problems of the mobilization period that arise after the termination of the PAD.

Under the pressure of the program for expansion of the defense mobilization base, PAD recruited, mostly from industry, a large staff of technical experts to handle the various requirements. This staff reached a peak in March 1952 of 342 people of whom 308 were salaried and 34 were serving without compensation. In addition, PAD had the services of experts who served as consultants from time to time as needed. The experts and consultants who served PAD without compensation brought to the Government men of wide experience and the highest caliber whose services could not otherwise have been obtained. With the progress in the mobilization expansion program it became possible to reduce this staff from time to time, retaining only those who were essential. This streamlining of the agency has continued until on December 31, 1953, the full-time personnel numbered 57, of whom 49 were salaried and 8 were serving without compensation. Expansion of PAD to meet requirements and the subsequent streamlining was in line with the agency's initial policy to build up only to the degree absolutely necessary and to reduce staff as rapidly as mobilization readiness permitted.

In accordance with this policy, the PAD will be terminated as soon as defense mobilization conditions will permit and an adequate peacetime Oil and Gas Division has been organized to assure oil and gas security.

AVGAS PRODUCTION - THOUSANDS B/D

	<u>1950</u>	<u>1951</u>	<u>1952</u>	<u>1953</u>
Jan. - June	110	190	204	243
July - Dec.	170	205	235	258 (Est.)

Source: Bureau of Mines

CRUDE OIL REFINING CAPACITY
Thousands B/D

January 1, 1950	6696
" " 1951	6964
" " 1952	7333
" " 1953	7639

Source: Bureau of Mines

REFINERY RUNS - THOUSANDS B/D

1950	5739
1951	6494
1952	6670
1953	7004 (Est.)

Source: 1950-52, Bureau of Mines; 1953, PAD Est.

WELLS DRILLED INCLUDING SERVICE

	<u>Total</u>	<u>Oil</u>	<u>Gas</u>	<u>Service</u>	<u>Dry</u>
1950	43,279	24,430	2,843	1,249	14,757
1951	44,516	23,453	3,030	1,380	16,653
1952	45,821	23,466	3,255	1,482	17,618
1953	49,279	25,762	8,806	1,262	18,449

Source: Oil & Gas Journal

AVERAGE CRUDE & NATURAL GAS LIQUIDS
PRODUCTION AND PRODUCTIVE CAPACITY
THOUSANDS B/D

<u>PRODUCTION</u>		<u>PRODUCTIVE CAPACITY</u>
1950	5,906	6,980
1951	6,719	7,500
1952	6,867	7,950
Jan. 1953	7,221	8,159

Source: Bureau of Mines

Source: National Petroleum
Council

OIL PIPELINE MILEAGE - U. S.

	<u>Crude Trunk</u>	<u>Crude Gathering</u>	<u>Product</u>	<u>Total</u>
January 1, 1950	71,373	60,560	20,881	152,814
January 1, 1953	75,228	68,040	27,155	170,423

Source: Bureau of Mines

UTILITY NATURAL GAS PIPELINE MILEAGE - U. S.

	<u>Field and Gathering Lines</u>	<u>Transmission Lines</u>	<u>Distribution Lines</u>	<u>Total</u>
January 1, 1950	30,860	98,270	152,350	281,480
January 1, 1951	32,850	109,360	172,270	314,480
January 1, 1952	34,580	115,240	192,710	342,530
January 1, 1953	38,480	118,160	211,310	367,950

Source: American Gas Association

ANNUAL NATURAL GAS UTILITY SALES

1950	- 3,658 billion cubic feet
1951	- 4,248 " " "
1952	- 4,683 " " "
1953 (Est.)	- 5,200 " " "

Source: American Gas Association

EXHIBIT 11

MOODY'S INDUSTRIAL MANUAL

AMERICAN and FOREIGN

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US-GEN003541

	1954	1953	1952	1951	1950	1949
Analysis of Operations						
Shipments, etc.	100.00	100.00	100.00	100.00	100.00	100.00
Cost of shipments & contr. plus adj.	30.56	33.75	31.58	28.54	27.13	26.82
Selling & general expenses	6.22	5.16	5.49	7.56	3.08	11.20
Operating income	13.12	11.09	12.93	13.88	11.79	7.99
Other income	0.40	0.61	0.42	0.56	1.21	1.51
Total	13.52	11.70	13.35	14.44	13.00	9.50
Income deductions	0.51	0.43	0.50	0.36	0.41	0.37
Sales discount	13.01	11.27	12.85	14.08	12.59	1.43
Net income before inc. etc. taxes	6.55	7.87	9.23	9.56	6.60	6.80
Income, etc. taxes						2.19
Prov. for post-war readjustments						
Net income to surplus	6.46	7.40	8.52	9.52	5.90	4.61

Shipments made and amounts involved plus contracts in progress.

FUNDED DEBT

1. Sperry Corp. sinking fund debenture 3½%, due 1969:

Rating—Baa

AUTHORIZED—\$20,000,000; outstanding, \$18,800,000.

DATED—June 1, 1949.

MATURITY—June 1, 1969.

INTEREST—J&D 1 at office of trustee.

TRUSTEE—City Bank Farmers Trust Co., New York.

DENOMINATION—Coupon \$1,000, registrable as to principal.

CALLABLE—As a whole, or in part by lot, on at least 30 days' published notice at any time to each June 1, incl., as follows:

1952—103½% 1955—103 1958—102½% 1961—102 1964—101½% 1967—101 1970—100½% 1973—100 and thereafter at par.

Also callable on any June 1, beginning 1953, for sinking fund (which see), on like notice, at sinking fund redemption prices to each June 1, incl., as follows:

1953—100% 1956—100% 1959—100% 1962—100% 1965—100% 1968—100% 1971—100% 1974—100% 1977—100% 1980—100% 1983—100% 1986—100% 1989—100% 1992—100% 1995—100% 1998—100% 2001—100% 2004—100% 2007—100% 2010—100% 2013—100% 2016—100% 2019—100% 2022—100% 2025—100% 2028—100% 2031—100% 2034—100% 2037—100% 2040—100% 2043—100% 2046—100% 2049—100% 2052—100% 2055—100% 2058—100% 2061—100% 2064—100% 2067—100% 2070—100% 2073—100% 2076—100% 2079—100% 2082—100% 2085—100% 2088—100% 2091—100% 2094—100% 2097—100% 2100—100% 2103—100% 2106—100% 2109—100% 2112—100% 2115—100% 2118—100% 2121—100% 2124—100% 2127—100% 2130—100% 2133—100% 2136—100% 2139—100% 2142—100% 2145—100% 2148—100% 2151—100% 2154—100% 2157—100% 2160—100% 2163—100% 2166—100% 2169—100% 2172—100% 2175—100% 2178—100% 2181—100% 2184—100% 2187—100% 2190—100% 2193—100% 2196—100% 2199—100% 2202—100% 2205—100% 2208—100% 2211—100% 2214—100% 2217—100% 2220—100% 2223—100% 2226—100% 2229—100% 2232—100% 2235—100% 2238—100% 2241—100% 2244—100% 2247—100% 2250—100% 2253—100% 2256—100% 2259—100% 2262—100% 2265—100% 2268—100% 2271—100% 2274—100% 2277—100% 2280—100% 2283—100% 2286—100% 2289—100% 2292—100% 2295—100% 2298—100% 2301—100% 2304—100% 2307—100% 2310—100% 2313—100% 2316—100% 2319—100% 2322—100% 2325—100% 2328—100% 2331—100% 2334—100% 2337—100% 2340—100% 2343—100% 2346—100% 2349—100% 2352—100% 2355—100% 2358—100% 2361—100% 2364—100% 2367—100% 2370—100% 2373—100% 2376—100% 2379—100% 2382—100% 2385—100% 2388—100% 2391—100% 2394—100% 2397—100% 2400—100% 2403—100% 2406—100% 2409—100% 2412—100% 2415—100% 2418—100% 2421—100% 2424—100% 2427—100% 2430—100% 2433—100% 2436—100% 2439—100% 2442—100% 2445—100% 2448—100% 2451—100% 2454—100% 2457—100% 2460—100% 2463—100% 2466—100% 2469—100% 2472—100% 2475—100% 2478—100% 2481—100% 2484—100% 2487—100% 2490—100% 2493—100% 2496—100% 2499—100% 2502—100% 2505—100% 2508—100% 2511—100% 2514—100% 2517—100% 2520—100% 2523—100% 2526—100% 2529—100% 2532—100% 2535—100% 2538—100% 2541—100% 2544—100% 2547—100% 2550—100% 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2853—100% 2856—100% 2859—100% 2862—100% 2865—100% 2868—100% 2871—100% 2874—100% 2877—100% 2880—100% 2883—100% 2886—100% 2889—100% 2892—100% 2895—100% 2898—100% 2901—100% 2904—100% 2907—100% 2910—100% 2913—100% 2916—100% 2919—100% 2922—100% 2925—100% 2928—100% 2931—100% 2934—100% 2937—100% 2940—100% 2943—100% 2946—100% 2949—100% 2952—100% 2955—100% 2958—100% 2961—100% 2964—100% 2967—100% 2970—100% 2973—100% 2976—100% 2979—100% 2982—100% 2985—100% 2988—100% 2991—100% 2994—100% 2997—100% 3000—100% 3003—100% 3006—100% 3009—100% 3012—100% 3015—100% 3018—100% 3021—100% 3024—100% 3027—100% 3030—100% 3033—100% 3036—100% 3039—100% 3042—100% 3045—100% 3048—100% 3051—100% 3054—100% 3057—100% 3060—100% 3063—100% 3066—100% 3069—100% 3072—100% 3075—100% 3078—100% 3081—100% 3084—100% 3087—100% 3090—100% 3093—100% 3096—100% 3099—100% 3102—100% 3105—100% 3108—100% 3111—100% 3114—100% 3117—100% 3120—100% 3123—100% 3126—100% 3129—100% 3132—100% 3135—100% 3138—100% 3141—100% 3144—100% 3147—100% 3150—100% 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4353—100% 4356—100% 4359—100% 4362—100% 4365—100% 4368—100% 4371—100% 4374—100% 4377—100% 4380—100% 4383—100% 4386—100% 4389—100% 4392—100% 4395—100% 4398—100% 4401—100% 4404—100% 4407—100% 4410—100% 4413—100% 4416—100% 4419—100% 4422—100% 4425—100% 4428—100% 4431—100% 4434—100% 4437—100% 4440—100% 4443—100% 4446—100% 4449—100% 4452—100% 4455—100% 4458—100% 4461—100% 4464—100% 4467—100% 4470—100% 4473—100% 4476—100% 4479—100% 4482—100% 4485—100% 4488—100% 4491—100% 4494—100% 4497—100% 4500—100% 4503—100% 4506—100% 4509—100% 4512—100% 4515—100% 4518—100% 4521—100% 4524—100% 4527—100% 4530—100% 4533—100% 4536—100% 4539—100% 4542—100% 4545—100% 4548—100% 4551—100% 4554—100% 4557—100% 4560—100% 4563—100% 4566—100% 4569—100% 4572—100% 4575—100% 4578—100% 4581—100% 4584—100% 4587—100% 4590—100% 4593—100% 4596—100% 4599—100% 4602—100% 4605—100% 4608—100% 4611—100% 4614—100% 4617—100% 4620—100% 4623—100% 4626—100% 4629—100% 4632—100% 4635—100% 4638—100% 4641—100% 4644—100% 4647—100% 4650—100% 4653—100% 4656—100% 4659—100% 4662—100% 4665—100% 4668—100% 4671—100% 4674—100% 4677—100% 4680—100% 4683—100% 4686—100% 4689—100% 4692—100% 4695—100% 4698—100% 4701—100% 4704—100% 4707—100% 4710—100% 4713—100% 4716—100% 4719—100% 4722—100% 4725—100% 4728—100% 4731—100% 4734—100% 4737—100% 4740—100% 4743—100% 4746—100% 4749—100% 4752—100% 4755—100% 4758—100% 4761—100% 4764—100% 4767—100% 4770—100% 4773—100% 4776—100% 4779—100% 4782—100% 4785—100% 4788—100% 4791—100% 4794—100% 4797—100% 4800—100% 4803—100% 4806—100% 4809—100% 4812—100% 4815—100% 4818—100% 4821—100% 4824—100% 4827—100% 4830—100% 4833—100% 4836—100% 4839—100% 4842—100% 4845—100% 4848—100% 4851—100% 4854—100% 4857—100% 4860—100% 4863—100% 4866—100% 4869—100% 4872—100% 4875—100% 4878—100% 4881—100% 4884—100% 4887—100% 4890—100% 4893—100% 4896—100% 4899—100% 4902—100% 4905—100% 4908—100% 4911—100% 4914—100% 4917—100% 4920—100% 4923—100% 4926—100% 4929—100% 4932—100% 4935—100% 4938—100% 4941—100% 4944—100% 4947—100% 4950—100% 4953—100% 4956—100% 4959—100% 4962—100% 4965—100% 4968—100% 4971—100% 4974—100% 4977—100% 4980—100% 4983—100% 4986—100% 4989—100% 4992—100% 4995—100% 4998—100% 5001—100% 5004—100% 5007—100% 5010—100% 5013—100% 5016—100% 5019—100% 5022—100% 5025—100% 5028—100% 5031—100% 5034—100% 5037—100% 5040—100% 5043—100% 5046—100% 5049—100% 5052—100% 5055—100% 5058—100% 5061—100% 5064—100% 5067—100% 5070—100% 5073—100% 5076—100% 5079—100% 5082—100% 5085—100% 5088—100% 5091—100% 5094—100% 5097—100% 5100—100

See separate statement following Standard Oil Co. (N. J.).

See Moody's Transportation Manual. Note: Numbers in parentheses indicate same company with split ownership. See other identical numerals similarly enclosed for total interest of company and subsidiaries. Also owned, as of Dec. 31, 1953, less than 100% voting control of the following subsidiaries:

Name, place of incorporation and business:

A/S Norske Esso (55.70%)—Refining and marketing in Norway

Aktieselskapet "Tiger" (98%)

Aktieselskapet Vestlandske Petroleumcompagni (100%)

Essoastasjonen Munkedamsveien A/S (96%)

Essoastasjonen Radhusgaten A/S (96%)

Essoastasjonen Sannervegten A/S (96%)

Essoastasjonen Trondhjemsveien A/S (96%)

Companhia Brasileira de Gas (formerly Companhia Nacional de Gas Esso Brazil) (1)

(83.79%)

Creole Petroleum Corp. (93.86%, increased to 95% by Jan., 1954), Del.—Producing, refining, transportation and marketing in Venezuela

Compania de Petroleo Lago (100%)

Standard Oil Co., C.A. (100%)—Inactive

Dansk Esso A/S (formerly Det Danske Petroleum A/S) (82.39%)—Marketing in Denmark

A/S Kalundborg Olieraffineri (55.17%)

Esso Nederland N. V. (formerly Standard Amerikaansche Petroleum Compagnie N. V. (66.81%), Netherlands—Marketing in Netherlands

1 unnamed foreign subsidiary (78.0%)

N.V. Petroleum Industrie Maatschappij (100%)

Esso Standard Algerie S. A., Algeria (99.98%)

—Marketing in Algeria

Entrepôts du Caroubier, S. A., Algeria (77%)

Esso Standard Maroc S. A. (3) (Morocco) (48.86%)

Esso Standard (Belgium) (87.62%)—Marketing in Belgium

Compagnie Industrielle Atlas, S. A. (4) (99.17%)

Esso Stand. (Luxembourg) (5) (0.33%)

Esso Standard (Luxembourg) (5) (99.67%)

Compagnie Industrielle Atlas, S. A. (0.33%) (4)

Esso Standard Italiana—Soc. per Azioni (90.23%)—Italy—Marketing

"La Columbia" Soc. Marittima per Azioni (8) (30.64%)

Societa Petrolifera Italiana per Azioni (7) (19.90%)

Esso Standard Maroc S. A., (3) Morocco (51.85%)

Esso Standard Oil Co. (Chile) S.A.C. (99.99%)

—Chile—Marketing in Chile

Esso Standard Tunisie S. A. (75.8%)—Tunisia

European Gas & Electric Co., Del. (81.68%)

European Gas & Electric Co. von Oesterreich G.m.b.H.—Inactive

Magyar Amerikai Olajipari Reszvenytársasag

Humble Oil & Refining Co., Tex.—(72.41%—increased to 87% in Nov., 1954)

Exploration and production in Georgia, Gulf coast states, New Mexico, Arizona and California. Refining in Texas, marketing and transportation in Texas and New Mexico

Humble Pipe Line Co., Tex.—Pipe lines

Imperial Oil, Ltd. (89.64%) Canada—Producing, refining, marketing and transportation in Canada

Aquila Petroleum Ltd.—Canada

Astral Petroleum Ltd.—Canada

Atlas Supply Co. of Canada, Ltd.

Atoka Petroleum, Ltd.—Canada

Auriga Petroleum Ltd.—Canada

Canora Petroleum Ltd.—Canada

Capella Petroleum Ltd.—Canada

One unnamed foreign subsidiary (100%)

Constellation Petroleum, Ltd.—Canada

Devcon Petroleum Ltd., Canada

Devon Estates Ltd., Canada

Devonian Natural Gas Co., Ltd.—Canada

Esso of Canada Limited

Esso Limited, Newfoundland—Inactive

Glenalpine Petroleum Ltd.

Glenavon Petroleum Ltd.

Glenarm Petroleum Ltd.

Glenmanor Petroleum Ltd.

Imperial Oil Air Transport Ltd.—

Imperial Oil Ltd. (Newfoundland)—Inactive

Imperial Oil Shipping Co., Ltd.—Tankers

Imperial Pipe Line Co., Ltd., The

Ioco Townsite, Ltd., Canada

Mantol Petroleum Ltd.

Maple Leaf Petroleum Ltd., Canada

Muskogee Petroleum Ltd.—Canada

Nisku Products Pipe Line Co., Ltd.

Northwest Co., Ltd.

Okmulgee Petroleum Ltd.—Canada

Padol Petroleum Ltd., Canada

Palean Petroleum Ltd., Canada

Pawhuska Petroleum Ltd.—Canada

Rigel Petroleum Ltd.

1 unnamed foreign subsidiary

1 unnamed foreign subsidiary

Sirius Petroleum Ltd.

Spica Petroleum Ltd.

St. Clair Processing Corp., Ltd.—In Liquidation

Stromo Petroleum Ltd., Canada

Taos Petroleum Ltd.—Canada

Terco Petroleum Ltd., Canada

Transit Co., Ltd., Canada

Transit & Storage Co., Del.

Vega Petroleum Ltd.

Walet Petroleum Ltd.—Canada

Weleeta Petroleum Ltd.—Canada

Wewoka Petroleum, Ltd., Canada

Winnipeg Pipe Line Co., Ltd.

International Petroleum Co., Ltd. (82.58%)

Canada—Producing, refining, transportation and marketing in Peru and Colombia

Andian National Corp. Ltd. (97.86%)—Canada

Compania Peruana de Gas S.A., Peru (72.87%)

Esso Colombiana S. A.—Colombia

Incan Petroleum Ltd., Canada—Inactive

International Petroleum (Colombia) Ltd.—Canada

Tropical Oil Co.—Inactive

"La Columbia" Societa Marittima per Azioni (6) (66.56%), Italy

Oy Esso Ab (formerly O/Y Esso A/B) Finland (66.66%)—Marketing in Finland

Societa Petrolifera Italiana (41.17%) (7)—Producing and refining in Italy

Societa Metanifera Italiana—Italy

United Petroleum Securities Corp. (77½%)

Esso Standard S. A. Francaise (formerly Standard Francaise des Petroles) (53%)—Producing, refining, transportation and marketing in France

Soc. Immobiliere Paris—Niel, S. A.

Societe Anonyme Marocaine "Le Bitume Liquide"—Morocco

Note: Numbers in parentheses indicate same company with split ownership. See other identical numerals similarly enclosed for total interest of company and subsidiaries.

Affiliates: As of Dec. 31, 1953, company owned 50% voting power (the other 50% being owned by another single interest): Ethyl Corp., New East Development Co., Standard Vacuum Oil Co.

Company owns 30% interest in Arabian American Oil Co. and Trans-Arabian Pipe Line Co.; 49% interest in Plantation Pipe Line Co. (see Moody's Transportation Manual); 40% interest in Yellowstone Pipe Line Co. operator of pipeline from Montana to Washington; 5% interest in Gewerkschaft, Brigitte, producer in Germany.

BUSINESS & PRODUCTS

Is primarily a holding company, subsidiaries engaging in the acquisition, exploration and exploitation of oil and gas lands; in buying and selling crude oil; in transporting oil by pipe line; in refining crude oil; in transporting refined products by pipe line, boat and automobile; in marketing petroleum products at wholesale and retail.

Subsidiaries also engage in producing, buying, selling, transporting and distributing of natural gas. An allied activity is the licensing of patent rights relating to the oil industry.

Subsidiaries also manufacture and/or sell gasoline and oil storage and dispensing equipment, oil heating equipment, insecticides, etc.

Subsidiaries also produce special lines of chemical products consumed by the petroleum industry and general lines of chemical products made from by-products of the industry.

Incidental to marketing operations, subsidiaries sell tires, batteries and other automotive accessories.

General references to the types of activity carried on in various geographical areas will be found under "Principal Plants & Properties."

PRINCIPAL PLANTS & PROPERTIES

Producing Department: Company affiliates in 1953 produced 14% of world's supply.

In 1953 company affiliates drilled 1,478 wells to develop production from proven fields.

They also drilled 382 wildcat wells. Of the 1,860 wells, 1,178 produced oil, 146 produced only gas, and the rest were dry holes. Important increases in proved reserves were recorded at the end of 1953.

As of Dec. 31, 1953 affiliates held net acreage and producing wells.

Net Acreage—

Owned: Proved Total Wells

United States 729,800 23,815,400 1,693

Canada 305,700 18,861,800 1,693

Venezuela 251,600 3,192,400 2,625

Oth. West. Hem. 43,000 2,487,000 2,125

Europe 16,200 4,365,700

Sub-total 1,329,900 52,722,300 23,195

Owned: 50% owned; Oth. West. Hem.

Europe 16,800 3,590,100 338

Middle East 249,600 92,491,600 80

Far East 16,200 12,220,800 376

Sub-total 282,600 108,302,500 794

Total 1,612,500 161,375,100 23,989

Includes total holdings of companies in which Standard owns more than 50% of the shares but only that percentage of the hold-

ings of other companies corresponding to Standard's percentage of stock owned of producing.

Does not include any reserves of wells of Mene Grande Oil Co., nor any, which are the subject of contracting arrangements between Petroleum Co., Ltd. and that company.

For the most part, the company listed was held either under lease to or by owners, including government government concession contracts of operations.

Within the United States, Humble Refining Co. has its most important refineries in Texas, but it also produces in other Gulf Coast areas, in California and Oklahoma.

Carter Oil Co. has refineries in Wyoming, Kansas, Montana, Michigan, Kentucky, Mississippi, Indiana, Alabama and more recently in the Willamette, the Dakotas and Montana and the northern Colorado, western Montana and northwestern Kansas.

Imperial Oil Ltd. operates in the most important properties being owned and Saskatchewan, Creole Petroleum operates in Venezuela, International Petroleum Co., Ltd., operates in Peru and through contractual arrangements Mene Grande Oil Co., Ltd., Venezuela subsidiaries produce relatively small quantities of crude in Argentina.

Company also has investment in companies which are important producers of crude in Indonesia, Saudi Arabia, and Eastern Hemisphere Operations.

Crude oil production of company and Hemisphere Affiliates (in thousands of barrels daily):

Affiliate: 1954 1953

Humble O. & R. 388 418

Carter Oil 62 61

Total U. S. 448 479

Imperial Oil 37 80

Creole Pet. 823 793

Intl Pet. 105 101

Others 1 1

Total 1,474 1,460

Note: Net production in 1952, 1,201, in 1950, 1,040 and in 1949, 957.

Pipe Line Department: Subsidiaries

and operated at end of 1949, 9,950 miles of trunk pipe lines in the United States; the lines carried 334,000,000 bbls. of other refined products.

Details of company's principal domestic subsidiaries are as follows:

Humble Pipe Line Co. operated 4,000 miles of trunk lines and 3,450 miles of branch lines in Texas and New Mexico, which the Baytown refinery in Texas and ports.

Intermediate Oil Pipe Line Co. operated 1,000 miles of trunk lines in Louisiana, Texas, Mississippi, Montana, Illinois, Wyoming, which deliver to consumers in Anchorage, and Baton Rouge and Billings and Laurel, Mont. and Oklahoma sold in July, 1954, 100,000 bbls. of oil.

Interest in Yellowstone Pipe Line Co. constructed a 540-mile pipeline from Billings, Mont. to Spokane, Wash. in 1954. Oil carried daily, 1954, 1952, 475,000; 1951, 450,000; 1950, 430,000.

Tuscarora Pipe Line Co., Ltd. operated 1,000 miles of product line. Original crude oil to New York harbor, converted in the tidies to transport from refinery in New Jersey to a point near Pittsburgh.

Not included in above are subsidiary systems in which company has an interest, i. e., Plantation Pipe Line Co. (see Moody's Transportation Manual), which transported through 2,000 miles of product pipe lines 189,000 bbls. daily and the Portland-Montreal system, which transported 145,000 bbls. daily in its 342 miles of trunk line pipe.

In Canada Imperial Oil owns the lines: Imperial Pipe Line Co., Ltd. gathers oil in Alberta; Winnipeg Pipe Co., Ltd. which has a 77-mile trunk line which consists of 195 miles of line to Toronto; Imperial Oil also has an interest in Trans Mountain Pipe Line, completed in 1955, a line from Edmonton and Interprovincial Pipe Line, which operates a line from Edmonton to Alberta.

In Colombia, South America, Andean National Corp., Ltd. owned 668 miles of line which connects producing fields to the coast contract expires Dec. 31, 1954.

In Venezuela, Creole Petroleum Co. has interest in 486 miles of trunk line including a 143-mile line from Lake Maracaibo to Amuay Bay.

Marine Transportation: Company moved about 500,000,000 bbls. of crude oil and refined products by ocean tanker in 1953.

of this volume was carried in 1954. The volume was owned by affiliates. At Dec. 31, 1954, the fleet consisted of 108 vessels, of which 100 were operated under the U. S. flag by the company.

The company also owns and operates 100 vessels, together with many oil tankers and barges. In 1954, affiliates owned 100 tankers and 6 lake tankers. The fleet was replaced by 7 ocean tankers and 12 ocean-going vessels. The fleet consists of 12 ocean-going vessels, 100,000 d.w.t. are under construction, 25,550 d.w.t. are under construction, and one of 37,333 d.w.t. is under construction.

Department: Company affiliates owned 100% of all oil refined by entire company in 1953.

Modernization programs have been completed or are in progress in many of the company's refineries to meet increased demands for products to improve efficiency and produce higher quality products. In Apr., 1955, completed the government owned Butyl plant at Baton Rouge, La.

Hemisphere refinery operating (thousand bbls. daily):

	1954	1953	1952	1951
Standard Oil Co.	228	245	252	247
Standard Oil Co.	19	20	20	18
Standard Oil Co.	473	488	507	498
Standard Oil Co.	720	753	779	763
Standard Oil Co.	214	204	191	184
Standard Oil Co.	146	134	127	127
Standard Oil Co.	405	393	420	431
Standard Oil Co.	66	67	65	58
Standard Oil Co.	33	30	30	30

Following data list the principal subsidiaries and the average crude oil production (thousand bbls. daily):

	1953	1952	1951
Standard Oil Co.	25	27	29
Standard Oil Co.	157	163	159
Standard Oil Co.	51	56	53
Standard Oil Co.	250	257	250
Standard Oil Co.	245	252	247
Standard Oil Co.	63	58	55
Standard Oil Co.	49	46	47
Standard Oil Co.	76	67	68
Standard Oil Co.	59	60	59
Standard Oil Co.	393	420	431
Standard Oil Co.	38	37	36

The refineries of subsidiaries are located at: Charleston, S. C.; Billings, Mont.; Rexburg, Idaho; N. S. loco, B. C.; Calgary, Alberta; Winnipeg, Man.; Edmonton, Alta.; Havana, Cuba; and Santiago, Chile. Also, Argentina, Brazil, and Mexico.

Marketing Department: In connection with the production of the various parts of the company, subsidiaries do business, either as producers or as consumers of oil, gas, and other products. Nearly all of the company's production is sold to subsidiaries. Subsidiaries sell products wholesale and retail.

Principal marketing subsidiaries of the company in Western Hemisphere at the end of 1954 were:

	Marketing in
Standard Oil Co.	United States
Standard Oil Co.	Canada
Standard Oil Co.	Brazil
Standard Oil Co.	West Indies and Central America
Standard Oil Co.	Chile
Standard Oil Co.	Peru & Colombia
Standard Oil Co.	Venezuela
Standard Oil Co.	Argentina
Standard Oil Co.	Uruguay

Marketing subsidiaries obtain most of their products from their own refineries or from refineries of other subsidiaries. Substantial quantities of products are purchased from outsiders in the United States and abroad.

In 1954 over 2,500 employees were employed in research, \$30,000,000 was spent for research and 316 patents were granted. Esso Research & Development Co. (formerly Standard Oil Development Co.) is primary research organization carrying on its own research, collects, purchases and disseminates the results of work by the laboratories of other affiliates.

The first privately financed atomic radiation laboratory in the oil industry is being built at the Esso Research Center in Linden, N. J. Its primary function, at first, will be the study of the application of gamma radiation to oil processes and products.

Refineries utilizing new design principles and processes went on stream at Bombay, India, and at Durban, South Africa. Fluid coking unit at Billings, Mont., began operating in Dec., 1954. Another fluid coking unit was being built at Baltimore, Md. The "fluidized solids" idea developed for fluid catalytic cracking has been adapted to handle extremely thick, sometimes solid, residues of crude oil. This process turns out superior yields of liquid products at a lower investment than was formerly required.

Three Fluid hydroformers nearing completion, and contracts have been let for three more, for a total capacity of 75,000 barrels a day. Fluid hydroforming uses the fluidized solids principle to make high-octane gasoline components.

Hydrogen, obtained as a by-product of hydroforming, has been put to work in still another refining process known as hydrofining, which is an important step in producing premium gasolines and heating oils. Several plants using this method started operation in 1954. Hydrofining is also being used in a lubricating oil finishing process in an Imperial oil refinery. Besides providing superior products, hydrofining eliminates acid treating and attendant problems of controlling air and water pollution.

Miscellaneous: Gilbert & Barker Mfg. Co. owns a plant at West Springfield, Mass., for manufacture of equipment for dispensing and storing oil and gasoline, of oil heating and air conditioning equipment, and of miscellaneous articles.

Subsidiaries and certain companies in which company has investments are engaged in licensing of various patent rights relating directly or indirectly to oil business and in the manufacture of general and special lines of chemical products made from by-products of the petroleum industry.

EASTERN HEMISPHERE OPERATIONS

Net crude oil production affiliates (thousand bbls. daily):

	1954	1953	1952
Affiliates:	286	254	247
Aramco	69	63	42
Iraq Pet. etc.	35	32	33
Standard-Vac.	3	---	---
Esso Stand. S.A.F.	12	10	9
Other	---	---	---
Total	405	359	331

Refinery crude runs (thousand bbls. daily):

	1954	1953	1952
Affiliates:	132	122	124
Esso Pet. Co. Ltd.	39	50	45
Esso Stand. S.A.F.	66	61	51
Aramco	56	42	41
Standard-Vac.	100	59	43
Others	---	---	---
Total	413	334	304

Note: With respect to affiliates owned 50% of the above statistics represent that portion of their volumes.

Europe: A high light of operations in Europe in 1954 was the discovery of crude oil by company's affiliate in France, Esso Standard S.A.F., after drilling one nonproductive test well, found oil on the next attempt, south of Bordeaux. Since then 3 more wells have been completed and the field is now producing at daily rate of about 6,000 bbls. of good quality, low-sulfur crude oil. Nearly 1,200,000 bbls. of this oil were processed in 1954 in the Port Jerome refinery, where total throughput was 17% higher than in 1953.

Gewerkchaft Brigitta, producing affiliate in West Germany, increased its production rate in 1953. The increase was largely due to the extension of Hemmels field in Oldenburg. Esso A. G.'s new refinery at Hamburg was completed in 1953. It is the largest refinery in West Germany, having a daily capacity of 37,000 bbls.

The great Esso refinery at Fawley, England, is now able to manufacture almost all the lubricating oil requirements of Esso Petroleum Co., Ltd.

In 1954, the new refinery at Antwerp, Belgium, owned and operated by Esso Standard Refinery, completed first full year with an average throughput of 25,000 bbls. daily. Additional equipment has been installed at this refinery to manufacture liquefied petroleum gas.

Middle East: Legal questions that for a while had postponed the company's purchase of shares of Arabian American Oil Co. were settled, and on Dec. 2, 1954, Jersey acquired a 30% stock interest in that company. Remaining interest is held 30% by Standard Oil Co. of Calif. and Texas Co. and 10% by Socony Vacuum Oil Co. Daily production of crude oil by Aramco (bbls.): 1954, 350,000; 1953, 345,000; 1952, 325,000; 1951, 762,000; 1950, 547,000.

Daily runs at Aramco's refinery at Ras Tanura averaged (bbls. daily): 1954, 213,000; 1953, 203,000; 1952, 170,000; 1951, 160,000.

Trans-Arabian Pipe Line Co. completed its 1,067-mile pipeline in Saudi Arabia in Dec., 1950. Operation of the TAPLine system began Dec. 2, 1950. Deliveries at terminal at Sidon in eastern Mediterranean totaled (bbls. daily): 1954, 318,000; 1953, 308,000; 1952, 309,000.

Iraq Petroleum Co., Ltd., in which company has an 11% participation continued exploration in several Middle East countries. At end of 1954 daily production rate averaged 561,000 barrels daily.

Far East: Standard-Vacuum Oil Co. (50% owned) operates from the Philippines to East Africa. Crude production averaged 69,800 (1953, 64,000; 1952, 66,000) barrels a day in 1954. Most of this was from fields in Sumatra, but there was also some production in New Guinea. In addition to exploratory work in Indonesia, company was exploring in Australia, India, Pakistan and British Somaliland.

Wholly-owned refineries in Indonesia, Australia, South Africa and India and 2 refineries in Japan in which company has a majority interest processed 111,600 bbls. a day in 1954. The largest refinery is at Palembang, in Sumatra. The new 16,000 bbl. refinery at Durban, South Africa began operations in Jan., 1954, and a new 25,000 bbl. refinery at Bombay, India began operation in June, 1954. The Altona plant, near Melbourne, Australia, expanded its capacity from 2,500 to 25,000 bbls. daily in early 1955. Company's refining capacity in early 1955 was 160,000 bbls. daily.

At Dec. 31, 1954, company's fleet consisted of 17 owned and 27 chartered deep-sea tankers in addition to 11 coastal vessels in the Indonesia area.

Iran: Company, together with Socony-Vacuum Oil Co., Inc., Standard Oil Co. (N. J.), Standard Oil Co. of Cal., Texas Co., Gulf Oil Corp., Anglo-Iranian Oil Co., Royal Dutch Shell and Compagnie Francaise des Petroles, formed a consortium to restore Iranian oil to world commerce. Agreements, to run for 40 years, were approved by Iranian parliament in Oct., 1954.

Consortium members have set up two companies under the laws of the Netherlands: one to explore for and produce crude oil in Iran within the area covered by the agreement; the other to operate the Abadan refinery. The two companies exercise managerial controls necessary to ensure successful operation. The National Iranian Oil Co. (owned by Iranian Government) has sole responsibility for all marketing within Iran and for producing and refining operations outside the area of the agreement. Iran is to receive one-half of net profits of the consortium.

A British company called Iranian Oil Participants Ltd., has been formed which holds the shares of the two Netherlands companies. Each consortium member subscribed to shares in this company equivalent to its interest under the applicable agreements. Anglo-Iranian holds 40% interest, the American firms share 40%, Royal Dutch Shell, 14% and Compagnie Francaise des Petroles, 6%. Each member takes its oil at the border of Iran and markets it independently.

In Apr., 1955, the 5 American companies referred to above reduced their interest from 40% to 35% by turning over a 5% interest to Iricon Agency, Ltd. organized to administer interests of Standard Oil Co. (Ohio), Atlantic Refining Co., Hancock Oil Co., Pacific Western Oil Corp., Richfield Oil Corp., Signal Oil & Gas Co., Tide Water Associated Oil Co., American Independent Oil Co. and San Jacinto Petroleum Corp.

CAPITAL EXPENDITURES

Capital and Exploration expenditures by consolidated affiliates in 1954 totaled \$764,000,000. This was slightly more than in 1953 and brought the total of capital and exploration expenditures since World War II to more than \$5,000,000,000. It is anticipated that such expenditures in 1955 will be somewhat higher than the record level of 1954.

Of the total 1954 expenditures, those for additions to property, plant, and equipment amounted to \$600,391,000 distributed as follows (in thousands of dollars):

	U. S.	Foreign	Total
Production	156,619	98,865	255,484
Refining	98,529	88,284	186,813
Marketing	39,842	57,622	97,464
Transportation	11,178	36,284	47,462
Other	4,060	7,108	11,168
Total	312,228	239,163	600,391

The above included payments for new producing wells and related equipment; modern refining units to produce greater yields of higher quality products; laboratories for production, process, and product research; tankships; pipelines; pumping stations; facilities for more effective and expanded marketing; and gas repressuring plants to increase the yields from oil fields.

In addition to the expenditures capitalized, other amounts spent in the search for oil during 1954 by consolidated companies totaled \$164,000,000. New discoveries were made, and known fields were extended. Estimated proved reserves of oil and gas were greater at the end of the year than at the beginning.

MANAGEMENT

Officers

Eugene Holman, Chairman
M. J. Rathbone, President
C. F. Smith, Vice-President
J. E. Crane, Vice-President
E. E. Soubry, Vice-President
L. W. Elliott, Vice-President
E. G. Collado, Treasurer
J. C. Anderson, Comptroller
J. O. Larson, Secretary

Directors

M. W. Boyer, New York

S. P. Coleman, New York
J. E. Crane, New York
L. W. Elliott, New York
H. H. Hewitson, New York
Eugene Holman, New York
P. F. Lamm, New York
H. W. Page, New York
A. T. Proudfit, New York
M. J. Rathbone, New York
D. A. Shepard, New York
C. F. Smith, New York
E. E. Soubry, New York
L. D. Welch, New York

General Counsel: E. T. Johnson, New York

Auditors: Price, Waterhouse & Co.
Annual Meeting: Fourth Wednesday
May.

No. of Stockholders: Dec. 31, 1953

General Office: 30 Rockefeller Plaza

Payrolls and Employees:

Year	Payrolls	Employees
1954	185,000	155,000
1953	185,000	155,000
1952	185,000	155,000
1951	185,000	155,000
1950	185,000	155,000

Consolidated, including European and Africa affiliates.

OPERATING STATISTICS

COMPARATIVE OPERATING STATISTICS, YEARS ENDED DEC. 31
(Consolidated and non-consolidated companies)

	1954	1953	1952	1951	1950
Gross Crude Oil Production					
United States	443,000	479,000	469,000	470,000	398,000
Canada	97,000	90,000	78,000	55,000	38,000
Latin America	929,000	897,000	906,000	885,000	792,000
Total Western Hemisphere	1,474,000	1,466,000	1,451,000	1,410,000	1,224,000
Eastern Hemisphere	419,000	372,000	339,000	286,000	220,000
Total World-wide	1,893,000	1,838,000	1,790,000	1,712,000	1,444,000
Net Crude Oil Production					
United States	387,000	414,000	406,000	407,000	342,000
Canada	84,000	78,000	65,000	55,000	33,000
Latin America	775,000	749,000	757,000	739,000	685,000
Total Western Hemisphere	1,246,000	1,241,000	1,228,000	1,201,000	1,040,000
Eastern Hemisphere	405,000	359,000	331,000	295,000	219,000
Total World-wide	1,651,000	1,600,000	1,559,000	1,496,000	1,259,000
Refinery Crude Runs					
United States	720,000	753,000	779,000	763,000	684,000
Canada	214,000	204,000	191,000	184,000	171,000
Latin America	650,000	624,000	642,000	646,000	599,000
Total Western Hemisphere	1,584,000	1,581,000	1,612,000	1,593,000	1,454,000
Eastern Hemisphere	413,000	334,000	304,000	220,000	151,000
Total World-wide	1,997,000	1,915,000	1,916,000	1,813,000	1,605,000
Products Sales					
Gasoline	798,000	764,000	726,000	664,000	597,000
Home heating oils, kerosene, and diesel oils	617,000	582,000	575,000	530,000	454,000
Heavy fuels	823,000	821,000	828,000	833,000	855,000
Other products	116,000	103,000	104,000	108,000	99,000
Total World-wide	2,154,000	2,070,000	2,033,000	1,933,000	1,705,000

Gross production includes royalties and oil payments due others on affiliates' share of production, but not operating partnership production; net production excludes royalty and oil payments due others and partners' share of production.

Note: For those affiliates in which company owns more than 50% of the shares, 100% of their operations is included in the above statistics; for those affiliates owned 50% or less, only company's proportion is included.

INCOME ACCOUNTS

COMPARATIVE CONSOLIDATED INCOME ACCOUNT, YEARS ENDED DEC. 31

(1954 figures taken from report to stockholders; prior years from reports filed with Securities and Exchange Commission)

	1954	1953	1952	1951	1950
Gross operating income	\$5,661,331,759	\$4,137,745,382	\$4,050,819,349	\$3,785,889,965	\$3,134,337,900
Costs and operating expenses	4,376,482,116	2,644,473,066	2,655,350,578	2,378,104,381	2,001,510,238
Net operating income	1,284,849,643	1,493,272,316	1,395,468,771	1,407,785,584	1,132,827,662
Depreciation	121,937,345	121,937,345	121,937,345	121,937,345	121,937,345
Depletion	304,003,146	304,003,146	304,003,146	304,003,146	304,003,146
Amortization	2,082,526	2,082,526	2,082,526	2,082,526	2,082,526
Retirements	19,246,497	19,246,497	19,246,497	19,246,497	19,246,497
Operating profits	858,959,152	843,629,657	796,149,041	869,080,985	634,800,426
Dividends received	144,341,208	144,341,208	144,341,208	144,341,208	144,341,208
Interest received	24,961,945	24,961,945	24,961,945	24,961,945	24,961,945
Profit on securities (net)	14,098,521	14,098,521	14,098,521	14,098,521	14,098,521
Miscellaneous other income	5,612,346	5,612,346	5,612,346	5,612,346	5,612,346
Total income	1,003,300,360	975,514,015	902,308,970	946,408,113	698,509,100
Prov. for losses in investments	135,138	135,138	135,138	135,138	135,138
Interest on funded & long-term debt	17,519,153	17,519,153	17,519,153	17,519,153	17,519,153
Other interest	7,301,105	7,301,105	7,301,105	7,301,105	7,301,105
Foreign exchange adjustments	5,166,668	5,166,668	5,166,668	5,166,668	5,166,668
Balance	978,344,914	957,667,315	891,654,107	931,056,572	679,656,264
Prov. for U. S. & foreign income taxes	311,000,000	311,000,000	311,000,000	311,000,000	311,000,000
Minority interests in earnings	82,551,756	82,551,756	82,551,756	82,551,756	82,551,756
Transfer to appropriate surplus	380,383,000	380,383,000	380,383,000	380,383,000	380,383,000
Inventory replacement adjustment	---	---	---	---	---
Net income to unapprop. surp.	584,793,158	552,825,969	519,931,109	528,460,779	408,223,223
Earned surplus Jan. 1	2,465,528,320	2,184,901,385	1,921,665,656	1,644,320,628	1,388,204,668
Other surplus credits	197,522,525	197,522,525	197,522,525	197,522,525	197,522,525
Cash dividends	280,475,885	272,080,184	258,881,961	249,599,049	151,027,388
Stock dividends	---	---	---	---	---
Other surplus debits	---	138,850	---	3,741,456	2,556,128
Earned surplus end of year	\$2,967,368,118	\$2,465,528,320	\$2,184,901,385	\$1,921,665,656	\$1,644,320,628
SUPPLEMENTARY P. & L. DATA					
Maintenance and repairs	Not stated	\$192,239,871	\$200,088,318	\$160,885,281	\$138,534,199
Depreciation and royalties	---	56,755,652	52,853,280	47,403,595	33,391,363
Parent company's net income	\$440,338,377	\$363,770,670	\$350,321,755	\$311,370,088	\$219,061,638
Equity earnings of subs. cons.	524,848,000	515,985,337	509,512,617	540,948,673	411,669,750
Dividends from subs. cons.	380,383,000	315,509,211	335,114,862	318,630,456	219,127,654
Equity in earnings of Std. Vacuum Oil Co. (50% owned)	Not stated	20,670,010	\$23,354,153	\$21,499,022	19,278,639
Dividends from Standard-Vacuum	---	12,000,000	9,500,000	10,000,000	10,000,000
Eq. in earn. Ethyl Corp. (50% owned)	---	10,505,220	9,060,017	8,069,194	9,624,000
Divs. from Ethyl Corp. (50% owned)	---	7,000,000	4,750,000	4,000,000	6,750,000

Includes related portions of items shown under "Supplementary P. & L. Data." Taxes (other than div. & inc.) and "Taxes withheld on dividends received," shown in above statement together equal "Taxes (other than income)" shown under "Supplementary P. & L. Data."

Includes operations of company and all affiliates owned more than 50%. For summary of earnings including European and North African subsidiaries for 1953, and prior years, see below.

Includes dividends received from com-

panies operating outside the Western Hemisphere (1953, \$26,089,557).

Excludes operations of subsidiaries located in Europe and North Africa. For summary of earnings, etc., including these subsidiaries for 1953 and prior years see below.

1951: Adjustment arising from stock split, \$1,888,203; adjustment of restricted earnings from pipeline operations.

Comprises:

1948-50: Restricted earnings from pipe line operations.

1951: Adjustment (net) in consolidation.

1954: Adjustments arising from consolidation of affiliates in Europe and North Africa. Includes \$107,522,525; transfer of reserve for losses on foreign investments, \$90,000,000; \$197,522,525.

1953: Includes \$12,811,931 profit from subsidiaries.

1949: Of which \$14,745,909 was credited to capital stock and \$25,050,299 to capital surplus.

1948: Of which \$34,837,992 was credited to capital stock and \$86,457,281 to capital surplus.

Includes appropriated earnings.

1953, \$12,312,846; 1952, \$12,334,910.

Depreciation Policy, Etc.: Policy with respect to depreciation, depletion, and amortization of property, art, and equipment is, in general, to charge income over the estimated life of such assets by application of either the unit of production method or the straight line method. In arriving at rates under unit of production method of depreciation and depletion, commercially recoverable oil or gas reserves were estimated by companies' engineers and geologists. Under straight line method annual rates applied to investment base have been estimated to take into consideration wear and tear, deterioration from natural causes and normal obsolescence, with due recognition of expected salvage value.

Intangible drilling costs are amortized on unit of production method except that intangible drilling costs applicable to dry holes and abandoned wells are charged to costs in the income statement.

an subsidiaries—in thousands of dollars):			
Net	Property	Long	
Property	Additions	Term Debt	Equity
2,317,781	351,622	464,258	2,687,983
2,500,156	442,597	468,188	2,978,719
2,787,285	565,489	502,872	3,262,928
3,019,828	588,517	581,749	3,571,617
3,574,892	600,391	496,805	4,313,729

Net Income.	Common Dividends	Com. Shs. Outstand.	Earn. Per Com. Sh.
97,774,583	53,421,683	26,224,767	3.73
147,993,147	65,549,815	26,224,767	5.64
76,053,170	39,329,769	26,618,065	2.86
89,128,756	33,461,089	27,285,917	3.27
123,886,746	47,773,536	27,285,917	4.54
140,572,419	68,196,465	27,285,917	5.15
83,361,920	54,537,332	27,285,917	3.08
121,327,773	54,562,253	27,285,917	4.41
155,398,489	68,271,485	27,333,742	5.69
194,156,126	68,334,332	27,333,742	5.64
177,609,931	84,187,926	27,333,742	6.50
268,626,580	109,334,968	27,333,742	9.32

¹Based on average number of shares outstanding in 1954.

[illegible]

MOODY'S INDUSTRIAL MANUAL

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GEOGRAPHICAL SUMMARY OF CONSOLIDATED NET ASSETS AND EARNINGS FOR 1954

	United States	Western Hemisphere	Europe and North Africa	Middle East and Far East	Total
Assets					
Investable securities	\$155,361,000	\$45,829,000	\$40,964,000	\$176,000	\$242,330,000
Other current assets	1,021,798,000	6,796,000	4,528,000	—	1,033,087,000
Liabilities					
Long-term debt	1,684,795,000	519,575,000	419,749,000	1,170,000	2,625,289,000
Current liabilities	452,346,000	314,361,000	333,011,000	3,565,000	1,103,283,000
Net Assets					
Working capital	1,232,449,000	205,214,000	36,738,000	\$2,395,000	1,522,006,000
Plant and equipment, less depreciation, etc.	37,075,000	80,552,000	43,911,000	\$185,058,000	346,586,000
Other assets	2,039,541,000	1,186,091,000	349,242,000	18,000	3,574,892,000
Net Income					
Operating income	32,480,000	17,353,000	17,313,000	819,000	67,965,000
Other income	3,341,545,000	1,489,210,000	497,204,000	183,500,000	5,511,459,000
Net Income					
Operating income	368,776,000	42,064,000	87,965,000	—	498,805,000
Other income	48,482,000	191,416,000	69,692,000	102,000	309,692,000
Net Income					
Operating income	139,571,000	212,647,000	39,015,000	—	391,233,000
Other income	554,829,000	446,127,000	196,672,000	102,000	1,197,730,000
Net Income					
Operating income	\$2,786,718,000	\$1,043,083,000	\$300,532,000	\$183,398,000	\$4,313,729,000
Other income	\$132,949,000	\$319,296,000	\$30,355,000	\$102,193,000	\$584,793,000

Company's equity in related net assets of more than its investments in subsidiaries in the non-consolidated area at Dec. 31, 1954. The procedures followed in convert-

ing the accounts of foreign affiliates into dollars are: (1) inventories purchased for dollars at their dollar cost, other current assets and current liabilities at year-end rates, (2) other assets and long-term debt at rates pre-

valuing at acquisition, and (3) reserves at rates prevailing when provided. Foreign exchange differences arising from the foregoing procedures have been included in consolidated net income.

COMPARATIVE BALANCE SHEET, AS OF DEC. 31 (Parent company only—Taken from report to stockholders)

	1954	1953	1952	1951	1950	1949	1948
Assets							
Investable securities	\$61,040,954	\$63,131,203	\$63,285,057	\$71,258,524	\$64,576,220	\$58,257,726	\$56,533,809
Other current assets	1,002,422,344	683,778,819	750,653,478	653,456,784	474,916,334	297,807,357	180,109,136
Plant and equipment, less depreciation	18,316,102	6,740,258	5,072,624	4,489,464	3,544,928	4,656,107	7,434,089
Liabilities							
Long-term debt	\$1,081,777,400	\$953,648,229	\$819,011,159	\$729,251,012	\$543,076,001	\$361,088,811	\$214,368,239
Current liabilities	1,593,241,287	933,201,229	932,515,109	932,235,039	831,373,577	\$758,527,680	743,899,647
Net Assets							
Working capital	165,260,591	93,657,930	104,322,970	116,485,782	211,453,916	202,099,799	172,921,518
Plant and equipment, less depreciation	217,406,336	225,614,750	190,759,841	187,239,459	191,372,581	184,764,355	180,199,969
Other assets	—	193,883,837	317,378,041	212,349,647	203,314,745	185,108,758	176,380,841
Net Income							
Operating income	10,914,448	9,142,638	11,843,723	11,998,041	435,570	423,222	88,482
Other income	—	—	—	—	—	—	—
Net Income							
Operating income	\$3,068,602,060	\$2,401,148,664	\$2,275,830,843	\$2,189,994,490	\$1,984,704,558	\$1,792,372,453	\$1,577,858,703
Other income	—	—	—	—	—	—	—
Net Income							
Operating income	\$10,660,689	\$9,292,841	\$9,997,020	\$10,637,620	\$9,851,189	\$12,917,044	\$16,097,116
Other income	507,877,599	427,589,951	392,141,468	401,802,030	273,862,340	69,980,579	124,302,614
Net Income							
Operating income	24,531,728	36,710,574	37,369,822	35,879,735	10,624,907	10,797,829	9,257,890
Other income	—	4,305,688	—	—	—	—	—
Net Income							
Operating income	\$543,069,996	\$477,899,054	\$439,508,310	\$448,419,385	\$294,338,436	\$93,676,452	\$149,657,620
Other income	—	—	—	—	—	—	—
Net Income							
Operating income	316,002,631	311,696,943	316,002,631	316,552,414	312,177,597	375,810,009	10,900,000
Other income	5,877,659	90,000,000	90,000,000	90,000,000	105,000,000	105,000,000	162,817,836
Net Income							
Operating income	530,511	553,221	574,567	596,585	618,623	640,652	21,702,461
Other income	981,532,110	908,50,380	908,566,380	908,566,380	757,138,650	754,584,361	734,635,877
Net Income							
Operating income	864,323,659	606,898,092	515,187,516	421,747,722	149,539,527	145,581,099	112,088,992
Other income	850,760,494	—	—	—	361,264,886	293,231,236	291,975,897
Net Income							
Operating income	\$3,068,602,060	\$2,401,148,664	\$2,275,830,843	\$2,189,994,490	\$1,984,704,558	\$1,792,372,453	\$1,577,858,703
Other income	\$538,709,404	\$475,749,226	\$379,502,849	\$280,831,027	\$248,737,565	\$267,413,359	\$64,710,619

Includes other marketable securities. Includes \$13,908,928 in 1949 and \$27,817,856 payable to Imperial Oil, Ltd. British, European and No. Africa

subsidaries consolidated for first time since 1939. Represents amount of stock issued in excess of par value. Note: Principally a holding company and therefore above statements should be read

only in conjunction with consolidated statements and other information contained herein. In 1944 acquired from subsidiaries marine equipment which was transferred to a subsidiary on Jan. 1, 1950.

FINANCIAL AND OPERATING DATA

	1954	1953	1952	1951	1950	1949	1948
Financial Data							
Assets per share—common	\$138.93	\$9.13	\$8.58	\$8.73	\$13.48	\$8.91	\$12.44
Liabilities per share—common	\$4.55	\$4.50	\$4.25	\$5.75	\$5.00	\$34.00	\$152.00
Net assets per share—common	112 1/4—71 3/4	78 1/4—67	95—72	175 1/4—58 1/4	92—66	74 1/4—60 1/4	92 1/4—60 1/4
Operating charges earned:	\$65.92	\$56.26	\$51.64	\$47.32	\$45.38	\$77.65	\$73.63
Operating income, taxes	37.09	66.59	59.48	84.40	45.34	39.84	89.09
Operating income, taxes	24.56	42.12	38.40	40.26	30.42	28.51	87.64
Operating income, taxes	96—91	91 1/4—85	94 1/4—80	96 1/4—89 1/4	98 1/4—96	98 1/4—93 1/4	96 1/4—82 1/4
Operating income, taxes	100 1/4—95 1/4	96 1/4—89	99 1/4—85 1/4	102 1/4—86 1/4	103 1/4—101 1/4	103 1/4—101 1/4	103 1/4—101 1/4
Operating income, taxes	39.883	38.674	37.807	37.500	36.863	35.889	35.202
Operating income, taxes	\$3,064	\$3,056	\$2,817	\$2,736	\$2,374	\$1,781	\$2,807
Operating income, taxes	65,435,474	60,571,082	60,571,082	60,571,082	30,285,546	30,183,394	29,385,435
Operating Ratios							
Assets to current liabilities	2.38	2.83	2.85	2.76	3.12	3.12	2.26
Assets to current liabilities	48.58	54.63	53.42	54.05	52.05	44.40	33.11
Assets to current assets	27.07	25.60	26.97	26.18	26.14	33.85	37.23
Assets to net worth	60.85	39.30	41.36	42.09	40.47	36.41	30.48
Assets to net worth	—	43.88	43.95	44.32	45.16	44.26	45.90
Assets to net worth	—	5.58	5.06	5.09	5.19	4.92	4.89
Assets to net worth	10.33	11.83	12.80	13.33	14.56	16.97	8.79
Assets to net worth	89.67	88.47	87.20	86.67	85.44	83.03	80.21
Assets to net worth	7.97	7.81	7.53	7.64	7.72	6.83	7.49
Assets to net worth	8.86	10.11	10.35	10.13	9.29	10.68	10.10
Assets to net worth	158.36	152.98	160.84	166.57	147.48	138.55	177.59
Assets to net worth	85.58	77.03	80.23	74.85	74.85	75.78	93.01
Assets to net worth	8.84	10.29	10.30	11.23	9.75	7.05	10.37
Assets to net worth	13.56	16.22	16.61	18.44	15.78	11.55	16.89
Operating Ratios							
Assets to net worth	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Assets to net worth	77.30	63.91	65.65	62.74	63.58	69.21	66.01
Assets to net worth	—	7.22	7.24	6.83	7.55	7.76	7.00
Assets to net worth	2.15	1.98	1.94	2.00	2.20	2.30	1.97
Assets to net worth	5.33	6.50	5.34	5.19	5.75	5.78	4.60
Assets to net worth	—	0.28	0.28	0.28	0.67	0.59	0.49
Assets to net worth	15.17	20.39	19.65	22.96	20.25	14.36	19.93
Assets to net worth	2.55	3.05	2.25	1.78	1.58	1.10	0.69
Assets to net worth	17.72	23.58	22.27	25.00	22.28	15.54	20.88
Assets to net worth	0.44	0.32	0.31	0.36	0.44	0.34	0.19
Assets to net worth	—	0.11	0.05	0.05	0.16	0.22	0.59

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Analysis of Operations (cont'd)

	1954	1953	1952	1951	1950	1949
Balance	17.28	23.15	22.01	24.59	21.68	15.23
Income taxes & surtax	5.49	7.95	7.23	9.58	5.60	15.23
Minority interest	1.46	1.84	1.94	2.10	2.05	1.97
Special deductions				0.05	0.05	0.05
Inventory replacement adjustment					0.05	0.05
Net income	10.33	13.36	12.84	13.96	13.02	8.83

Based on report to stockholders.

Includes \$3.25 paid prior to 2-for-1 split.

Also in stock, 1949, 2%, 1948, 5%.

After stock split; before, 121% 90%.

1953 and prior years exclude subsidiaries in Europe and North Africa. Including such companies: 1953, \$9.59; 1952, \$13.58.

Based on average number of shares outstanding \$9.56.

Before special deductions.

Includes 2 cents paid in connection with sale of assets of Portland Pipe Line Co.

FUNDED DEBT

1. Standard Oil Co. (New Jersey) debenture 2 3/4% due 1971. Rating—Aaa. AUTHORIZED—\$85,000,000; outstanding, \$85,000,000.

DATED—May 15, 1946.

MATURITY—May 15, 1971.

INTEREST—M&N 15 at office of J. P. Morgan & Co. Inc., New York. Principal and interest payable in U. S. legal tender.

TRUSTEE—Chase Manhattan Bank, New York.

REGISTRAR—Guaranty Trust Co., New York. DENOMINATION—Coupon, \$1,000; registrable as to principal; fully registered, \$1,000, \$5,000, \$10,000 and other authorized multiples of \$1,000. C&R and the several denominations interchangeable.

CALLABLE—As a whole, or in part by lot, on at least 30 days' published notice at any time to each May 15, incl., as follows:

1951..... 100% 1952..... 100% 1953..... 100% 1954..... 100% 1955..... 100% 1956..... 100%

After May 15, 1956.

SECURITY—Not secured by any lien. CREATION OF ADDITIONAL DEBT—If any stock now owned or hereafter acquired of a corporation operating principally in the United States or Canada of which company directly or indirectly controls more than 50% of the voting securities is pledged as security for any debt or obligations, company will secure outstanding debentures ratably therewith.

RIGHTS ON DEFAULT—In event of default 90 day grace period for payment of interest; trustee may, and on request of a majority of debenture holders, accelerate maturity.

INDENTURE MODIFICATION—Indenture may be modified except as provided with consent of 66 2/3% of debentures.

PURPOSE—Net proceeds, with other funds, used to redeem debenture 3 1/2% due 1961.

TAX STATUS—No provision for assumption or refund of any Federal or state tax.

LEGAL—For trust funds in Virginia and for savings banks in New Jersey.

LISTED—On New York Stock Exchange.

OFFERED—(\$85,000,000) at 98 (proceeds to company 97%) on May 15, 1946 by a syndicate headed by Morgan Stanley & Co., New York.

2. Standard Oil Co. (New Jersey) debenture 2 3/4% due 1974. Rating—Aaa. AUTHORIZED—\$150,000,000; outstanding, \$150,000,000.

DATED—July 15, 1949.

MATURITY—July 15, 1974.

INTEREST—J&J 15 at office of J. P. Morgan & Co. Inc., New York. Principal and interest payable in U. S. legal tender.

REGISTRAR—Guaranty Trust Co., New York. DENOMINATION—Coupon \$1,000, registrable as to principal; fully registered \$1,000, \$5,000, \$10,000 and authorized multiples of \$1,000. C&R and denominations interchangeable.

CALLABLE—As a whole, or in part by lot, on 30 days' notice at any time to each July 15, incl., as follows:

1953..... 100% 1954..... 100% 1955..... 100% 1956..... 100% 1957..... 100% 1958..... 100%

and thereafter at par.

SECURITY—Debentures are direct obligations of company, not secured by any lien.

If company pledges any stock of any company incorporated or operating principally in the United States or Canada in which company owns or directly or indirectly controls more than 50% of the voting securities, debentures will be secured equally.

RIGHTS ON DEFAULT—In event of default 90 day grace period for payment of interest; trustee shall exercise rights and powers under indenture, and majority of debentures have

right to direct any proceeding for remedies available to trustees.

INDENTURE MODIFICATION—Indenture may be modified except as provided, with consent of 66 2/3% of debentures.

PURPOSE—Proceeds for capital expenditures by company and subsidiaries.

TAX STATUS—No provision for assumption or refund of any Federal or state tax.

LISTED—On New York Stock Exchange.

LEGAL—For savings banks in Massachusetts and New Jersey; also for trust funds in Virginia.

OFFERED—(\$150,000,000) at 100% (proceeds to company, 99%) on July 13, 1949 by a group headed by Morgan Stanley & Co., New York.

3. Standard Oil Co. (New Jersey) 3% notes, due 1979.

Issued and outstanding, \$75,000,000; sold to a group of institutions at 101.

Dated Feb. 1, 1949; due Feb. 1, 1979. Interest payable F&A 1. Company has right to prepay notes in whole or in part at 104 to Feb. 1, 1951, decreasing periodically thereafter.

Notes are not secured. Proceeds to purchase 30% interest in Arabian American Oil Co.

Other Debt: Outstanding, Dec. 31, 1954, \$6,002,631 loan payable due in 1958.

Subsidiaries' Debt: As of Dec. 31, 1954, excluding \$48,740,475 maturing within one year.

Esso & G. (Germany):

3% bonds, due 1959 to 1983 .. \$6,123,350

Loans from banks & insurance

cos. at 5% to 9%, due 1958 to

1962 .. 4,496,322

Esso Petroleum Co., Ltd. (U.K.):

5% 1st deb. stock, due 1983 to

1973 .. 28,175,000

Esso Standard Italiana—S.p.A.:

6% debentures, due 1956 to

1969 .. 8,032,199

Esso Standard Refinery (Belgium):

Loans from national corpora-

tion for industrial credit:

5.5%, due 1956 to 1959 .. 7,200,000

6%, due 1960 to 1964 .. 8,500,000

Esso Standard S.A.F. (France):

Notes payable to banks—due

1956 to 1958 .. 4,286,618

5.6% loan to insurance co.—

due Jan. 7, 1961 .. 3,145,000

Humble Oil & Refining Co.:

Purch. oblig., 1956 to 1978 ..

6,289,021

Humble Pipe Line Company:

2 1/4% note payable to bank,

due 1958 to 1960 .. 7,000,000

Imperial Oil Ltd.:

3% s. f. deb., due Dec. 15, 1969

2 1/4% debentures, due 1950 to

1959 .. 36,200,000

Imperial Oil Shipping Co. Ltd.:

3% notes pay. to insurance co.,

due 1956 to 1959 .. 3,086,702

Interstate Oil Pipe Line Co.:

3 1/4% s. f. deb., due 1958 to

1977 .. 25,000,000

2% notes pay. to banks, due

1956 & 1957 .. 4,800,000

Tuscarora Pipe Line Co., Ltd.:

2.85% notes payable to insur-

ance company, due 1956 to

1970 .. 6,430,000

Miscellaneous .. 17,608,335

See appended statement.

See Moody's Transportation Manual.

CAPITAL STOCK

1. Standard Oil Company (New Jersey) capital stock: par \$15:

AUTHORIZED—80,000,000 shares; issued and outstanding, Dec. 31, 1954, 65,435,474 shares

(including 65,575 shares reacquired in Dec., 1950, four \$25 shares in \$100 share; from \$25 par to \$100 share, two \$15 shares issued in share).

	1954	1953	1952	1951	1950	1949
1951..... 12.00	1952..... 12.00	1953..... 12.00	1954..... 12.00	1955..... 12.00	1956..... 12.00	1957..... 12.00
1958..... 12.00	1959..... 12.00	1960..... 12.00	1961..... 12.00	1962..... 12.00	1963..... 12.00	1964..... 12.00
1965..... 12.00	1966..... 12.00	1967..... 12.00	1968..... 12.00	1969..... 12.00	1970..... 12.00	1971..... 12.00
1972..... 12.00	1973..... 12.00	1974..... 12.00	1975..... 12.00	1976..... 12.00	1977..... 12.00	1978..... 12.00
1979..... 12.00	1980..... 12.00	1981..... 12.00	1982..... 12.00	1983..... 12.00	1984..... 12.00	1985..... 12.00
1986..... 12.00	1987..... 12.00	1988..... 12.00	1989..... 12.00	1990..... 12.00	1991..... 12.00	1992..... 12.00
1993..... 12.00	1994..... 12.00	1995..... 12.00	1996..... 12.00	1997..... 12.00	1998..... 12.00	1999..... 12.00
2000..... 12.00	2001..... 12.00	2002..... 12.00	2003..... 12.00	2004..... 12.00	2005..... 12.00	2006..... 12.00
2007..... 12.00	2008..... 12.00	2009..... 12.00	2010..... 12.00	2011..... 12.00	2012..... 12.00	2013..... 12.00
2014..... 12.00	2015..... 12.00	2016..... 12.00	2017..... 12.00	2018..... 12.00	2019..... 12.00	2020..... 12.00
2021..... 12.00	2022..... 12.00	2023..... 12.00	2024..... 12.00	2025..... 12.00	2026..... 12.00	2027..... 12.00
2028..... 12.00	2029..... 12.00	2030..... 12.00	2031..... 12.00	2032..... 12.00	2033..... 12.00	2034..... 12.00
2035..... 12.00	2036..... 12.00	2037..... 12.00	2038..... 12.00	2039..... 12.00	2040..... 12.00	2041..... 12.00
2042..... 12.00	2043..... 12.00	2044..... 12.00	2045..... 12.00	2046..... 12.00	2047..... 12.00	2048..... 12.00
2049..... 12.00	2050..... 12.00	2051..... 12.00	2052..... 12.00	2053..... 12.00	2054..... 12.00	2055..... 12.00
2056..... 12.00	2057..... 12.00	2058..... 12.00	2059..... 12.00	2060..... 12.00	2061..... 12.00	2062..... 12.00
2063..... 12.00	2064..... 12.00	2065..... 12.00	2066..... 12.00	2067..... 12.00	2068..... 12.00	2069..... 12.00
2070..... 12.00	2071..... 12.00	2072..... 12.00	2073..... 12.00	2074..... 12.00	2075..... 12.00	2076..... 12.00
2077..... 12.00	2078..... 12.00	2079..... 12.00	2080..... 12.00	2081..... 12.00	2082..... 12.00	2083..... 12.00
2084..... 12.00	2085..... 12.00	2086..... 12.00	2087..... 12.00	2088..... 12.00	2089..... 12.00	2090..... 12.00
2091..... 12.00	2092..... 12.00	2093..... 12.00	2094..... 12.00	2095..... 12.00	2096..... 12.00	2097..... 12.00
2098..... 12.00	2099..... 12.00	2100..... 12.00	2101..... 12.00	2102..... 12.00	2103..... 12.00	2104..... 12.00
2105..... 12.00	2106..... 12.00	2107..... 12.00	2108..... 12.00	2109..... 12.00	2110..... 12.00	2111..... 12.00
2112..... 12.00	2113..... 12.00	2114..... 12.00	2115..... 12.00	2116..... 12.00	2117..... 12.00	2118..... 12.00
2119..... 12.00	2120..... 12.00	2121..... 12.00	2122..... 12.00	2123..... 12.00	2124..... 12.00	2125..... 12.00
2126..... 12.00	2127..... 12.00	2128..... 12.00	2129..... 12.00	2130..... 12.00	2131..... 12.00	2132..... 12.00
2133..... 12.00	2134..... 12.00	2135..... 12.00	2136..... 12.00	2137..... 12.00	2138..... 12.00	2139..... 12.00
2140..... 12.00	2141..... 12.00	2142..... 12.00	2143..... 12.00	2144..... 12.00	2145..... 12.00	2146..... 12.00
2147..... 12.00	2148..... 12.00	2149..... 12.00	2150..... 12.00	2151..... 12.00	2152..... 12.00	2153..... 12.00
2154..... 12.00	2155..... 12.00	2156..... 12.00	2157..... 12.00	2158..... 12.00	2159..... 12.00	2160..... 12.00
2161..... 12.00	2162..... 12.00	2163..... 12.00	2164..... 12.00	2165..... 12.00	2166..... 12.00	2167..... 12.00
2168..... 12.00	2169..... 12.00	2170..... 12.00	2171..... 12.00	2172..... 12.00	2173..... 12.00	2174..... 12.00
2175..... 12.00	2176..... 12.00	2177..... 12.00	2178..... 12.00	2179..... 12.00	2180..... 12.00	2181..... 12.00
2182..... 12.00	2183..... 12.00	2184..... 12.00	2185..... 12.00	2186..... 12.00	2187..... 12.00	2188..... 12.00
2189..... 12.00	2190..... 12.00	2191..... 12.00	2192..... 12.00	2193..... 12.00	2194..... 12.00	2195..... 12.00
2196..... 12.00	2197..... 12.00	2198..... 12.00	2199..... 12.00	2200..... 12.00	2201..... 12.00	2202..... 12.00
2203..... 12.00	2204..... 12.00	2205..... 12.00	2206..... 12.00	2207..... 12.00	2208..... 12.00	2209..... 12.00
2210..... 12.00	2211..... 12.00	2212..... 12.00	2213..... 12.00	2214..... 12.00	2215..... 12.00	2216..... 12.00
2217..... 12.00	2218..... 12.00	2219..... 12.00	2220..... 12.00	2221..... 12.00	2222..... 12.00	2223..... 12.00
2224..... 12.00	2225..... 12.00	2226..... 12.00	2227..... 12.00	2228..... 12.00	2229..... 12.00	2230..... 12.00
2231..... 12.00	2232..... 12.00	2233..... 12.00	2234..... 12.00	2235..... 12.00	2236..... 12.00	2237..... 12.00
2238..... 12.00	2239..... 12.00	2240..... 12.00	2241..... 12.00	2242..... 12.00	2243..... 12.00	2244..... 12.00
2245..... 12.00	2246..... 12.00	2247..... 12.00	2248..... 12.00	2249..... 12.00	2250..... 12.00	2251..... 12.00
2252..... 12.00	2253..... 12.00	2254..... 12.00	2255..... 12.00	2256..... 12.00	2257..... 12.00	2258..... 12.00
2259..... 12.00	2260..... 12.00	2261..... 12.00	2262..... 12.00	2263..... 12.00	2264..... 12.00	2265..... 12.00
2266..... 12.00	2267..... 12.00	2268..... 12.00	2269..... 12.00	2270..... 12.00	2271..... 12.00	2272..... 12.00
2273..... 12.00	2274..... 12.00	2275..... 12.00	2276..... 12.00	2277..... 12.00	2278..... 12.00	2279..... 12.00
2280..... 12.00	2281..... 12.00	2282..... 12.00	2283..... 12.00	2284..... 12.00	2285..... 12.00	2286..... 12.00
2287..... 12.00	2288..... 12.00	2289..... 12.00	2290..... 12.00	2291..... 12.00	2292..... 12.00	2293..... 12.

Deferred credits --	79,773	47,428
Carried forward --	251,129	259,326
Total -----	\$3,386,992	\$3,297,798
At cost less depreciation: 1954,	\$714,746	\$748,968
1953, \$714,746.		

Capital Stock **1. Cleveland Petroleum Co., Ltd. ordinary stock:**

AUTHORIZED—Issued and paid up, \$550,000; transferable in units of \$1.

PREFERENCES—Entitled to fixed cumulative dividends of 6% and after payment of fixed dividends, to participate in dividends on deferred stock, entitled to 40% of any further distributions (balance of 50% to deferred stock).

LIQUIDATION RIGHTS—In liquidation, have priority as to an aggregate sum of \$400,000 and fixed dividends, and after payment of an aggregate sum of \$75,000 to deferred stock, ordinary is entitled to 40% of any remaining balance of 60% to deferred stock).

VOTING—One share equals one vote per \$1.

DIVIDENDS PAID—Years ended Oct. 31: 1930, 8%; 1931, 6%; 1932-34, none; 1935 (2 1/2 years to Oct. 31, 1933), 20%; 1936 (2 years to Oct. 31, 1933), 16% and 16% for year ended Oct. 31, 1936); 1937, 50%; 1938, 22 1/2%; 10 months and 3 days to Sept. 3, 1939, 14%; Sept. 4, 1939 to

Oct. 31, 1940, 10%; 1941 to 1946, incl., 10%; 1947 to 1950, 10%; to Dec. 31, 1952, 1948, 12%; 1949, 15%; 1950, 18%; 1951 and 1952, 15%; 1953, 15% plus 12½% (free of tax), 1954, 15% less tax.

LISTED—On London Stock Exchange.

PRICE RANGE— 1954 1953 1952 1951 1950
High 62/4 60/0 59/0 70/0 56/3
Low 35/6 39/0 33/9 53/0 48/9

2. Cleveland Petroleum Co., Ltd. deferred stock:

AUTHORIZED—Issued and paid up, £300,000; transferable in units of 10s.

VOTING RIGHTS—Has one vote per £4. For other provisions, see ordinary stock (No. 1).

DIVIDENDS—Years ended Oct. 31, 1930, 3%; 1931, 20%; 1932-35, none; 1936, 72%; 1937, 34½%; 1938, 46½%; 1939 (10 mos. and 2 days to Sept. 3), 24½%; 1940, 1941 to 1946, incl., 13½%; 1947 (14 mos. to Dec. 31), 16.87%; 1948, 19.0%; 1949, 27½%; 1950, 35½%; 1951 to 1953, 27½% plus 34½% (less tax) and 1½% cash bonus (free of tax); 1954, 15% less tax.

LISTED—On London Stock Exchange.

PRICE RANGE— 1954 1953 1952 1951 1950
High 62/6 48/9 55/7 70/0 54/4
Low 33/9 38/9 38/1 33/9 48/9

(Affiliated with Standard Oil Co. [N. J.])

lys. per Sh.	Call	Price Range
1954	Price	1954 1932-54
50 \$7.00		127½-73½ 127½-130

On Sept. 2, 1942 all of the assets and properties of Lagomar Oil Concessions, Inc. (formerly a wholly-owned subsidiary of Lago Petroleum) were transferred to Creole and Lago Petroleum Concessions, Inc. was liquidated.

On Sept. 20, 1943, La Salina refinery of Cia. de Petroleo Lago as well as its marketing business and properties, were transferred to Creole.

On Aug. 13, 1947, Standard Oil Co. (N. J.), as a settlement of stockholders' court action, returned to Creole 750,000 shares of Creole which it received through Lago Petroleum in above mentioned consolidation.

SUBSIDIARIES

Company is primarily an operating company. It has two subsidiaries:

- Compania de Petroleo Lago (wholly-owned). Ship owner in Caribbean area.
- Standard Oil Co. C. A.

PARENT

As of Dec. 31, 1954, Standard Oil Co. (New Jersey) owned 95% of company's stock.

BUSINESS & PRODUCTS

Chiefly engaged in acquiring, exploring and developing crude oil properties in Venezuela S. A. The company has an interest in various pipe lines and terminals and has extended marketing facilities in Venezuela. Allied activities include the operation of housing, educational, health and recreational facilities for its employees.

Marketing: The quantities sold were as follows (in M bbls.)

	1954	1953	1952
Crude oil	250,681	239,664	245,133
Gas & naphtha ..	6,546	6,266	5,363
Refined oil	1,465	1,380	1,291
Distillate fuel oil	13,767	11,772	10,733
Residual fuel oil	29,630	23,056	27,600
Miscellaneous ..	1,408	1,623	1,477
Total	3303,503	288,761	291,610

Company also has part interest in West-
Guara gasoline plant, operating as a light-
end recovery plant. Operation of Tia Juana
Conservation Plant No. 1 began in Oct., 1954.
It was designed to increase oil recovery
from Eocene reservoir by injection of 137,
000,000 cu. ft. of gas daily.

Pipe Lines: Company owns various pipe
lines and terminals for the transporting and
shipping of petroleum products and interest,
along with other companies, in additional ter-
minals and pipe lines in the oil fields and
cities of this character such as the 122 mile
16 inch pipe line constructed by Mene Grande
Oil Co. connecting the Oficina field with
Puerto de La Cruz. Company also has an
interest in 18 inch pipe line extending 95
miles from Travesoto to Puerto de La Cruz.
In Dec., 1948 placed in operation a 145 mile
24 in. to 26 in. pipe line from Ule near La
Safina to Amuay Terminal.

In 1953 a 26 inch pipeline paralleling the
present Ule-Amuay line was put into opera-
tion. Both lines have a capacity of 500,000
bbls. daily.

Marine: In 1952, company acquired 9 sal-
low draft tankers (45,639 DWT) formerly uti-
lized under a charter arrangement. Tanker
fleet now consists of 11 Panamanian flag
vessels (61,281 DWT) owned by Creole and 10
Venezuelan flag vessels (59,664 DWT) owned
by its wholly owned subsidiary, Cia. de Pe-
troleo Lago. Additional tanker capacity as re-
quired, is obtained by charter.

Capital Expenditures: By departments:

	1954	1953
Production	\$81,197,706	\$63,362,851
Refining	28,061,894	12,572,677
Pipe Line	5,125,730	9,818,082
Marketing	2,289,979	1,860,686
Marine	1,475,159	2,822,552
Administrative	4,481,705	4,003,315
Total	\$91,019,173	\$94,440,173

MANAGEMENT

10.4% in Canada, 34.2% in Latin America
15.8% in Eastern Hemisphere and 2.3%

Armed Forces, etc.

PRINCIPAL PLANTS & PROPERTIES

Production: As of Dec. 31, 1954 company had a net equity in 2,915,706 acres of concessions for the exploration and development of petroleum and other hydrocarbons in Venezuela. In 1954 company and partners drilled 202 wells and at Dec. 31, 1954 had 2,806 producing wells.

Combined net production and purchases royalty oil of company

1945	185,329,772	1950	243,887,151
1946	199,067,503	1951	276,679,261
1947	215,146,148	1952	294,046,926
1948	232,456,221	1953	298,913,477
1949	215,749,724	1954	299,956,222

Refineries: Company's refineries are located at Caripito and Amuay. The Amuay refinery was placed in operation in 1950 and has a rated daily capacity of 70,000 bbl.

Company has an agreement with Lago Oil & Transport Co., Ltd., which provides that the full capacity of the Aruba Refinery is available for processing crude sold to Lago by Creole and that, after deducting actual refining costs (including depreciation) and a specified return on Aruba's net depreciated plant investment and inventories, the amount realized from sale of refined products constitutes the sales price to Creole.

Other Plants: Company has part interest in Chihinea pressure maintenance plant with capacity to compress 44 million cubic feet of gas daily.

Officers
H. W. Haight, President
H. A. Jarvis, Exec. Vice-President
L. G. Smith, Vice-President
H. A. Metzger, Vice-Pres.
J. E. Andrews, Comptroller
J. H. McCutchan, Treasurer
E. J. Mundy, Jr., Sec. and Asst. Treas.
R. Prince, Asst. Compt.
R. E. Mays, Asst. Compt.
C. F. Lindsley, Jr., Asst. Secretary
G. J. Berkel, Jr., Asst. Sec.
C. J. Barrientos, Asst. Treasurer
A. E. Becker, Jr., Asst. Treasurer
B. M. Owen, Asst. Treasurer

Directors
G. L. Burr, New York
J. T. Fly, New York
H. J. Wright, Venezuela
L. G. Smith, New York
H. W. Haight, Venezuela
G. Zuloaga, Venezuela
H. A. Jarvis, Venezuela
W. A. M. Greeven, Venezuela
H. A. Metzger, New York
L. Cade, Venezuela
M. E. Jones, Venezuela
L. E. Lowry, Venezuela
S. Vazquez, Venezuela

Annual Meeting: In April or May on day fixed by directors.

Auditors: Price, Waterhouse & Co.

Number of Stockholders: Dec. 31, 1954, 4,477

Number of Employees: Dec. 31, 1954, 14,400

Principal Office: 100 West Tenth St., Wilmington, Del.

MOODY'S INDUSTRIAL MANUAL

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CAPITAL STOCK

L. Creole Petroleum Corp. capital stock:
 AUTHORIZED—20,250,000 shares; issued and outstanding, 25,865,310 shares; par \$5 (changed from par \$5 to no par in 1953, share for share); changed from no par to par \$5 May 18, 1933, share for share).

Note: In May, 1955 stockholders were to vote on a proposal to increase authorized shares to 30,000,000 and split \$5 par shares 3-for-1.

As of Dec. 31, 1954, Standard Oil Co. (N. J.) owned 95% of outstanding shares.

Dividend Record (in \$)

	1954	1953	1952	1951	1950
1954-55	1.00	1.00	0.75	0.75	0.50
1944-45	1.25	1.00	0.75	0.75	0.50
1943-44	1.25	1.00	0.75	0.75	0.50
1942-43	1.25	1.00	0.75	0.75	0.50
1941-42	1.25	1.00	0.75	0.75	0.50
1940-41	1.25	1.00	0.75	0.75	0.50
1939-40	1.25	1.00	0.75	0.75	0.50
1938-39	1.25	1.00	0.75	0.75	0.50
1937-38	1.25	1.00	0.75	0.75	0.50
1936-37	1.25	1.00	0.75	0.75	0.50
1935-36	1.25	1.00	0.75	0.75	0.50
1934-35	1.25	1.00	0.75	0.75	0.50

1933-34: 1.25

1932-33: 1.25

1931-32: 1.25

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MOODY'S INDUSTRIAL MANUAL

1525

IMPERIAL OIL LTD.

(Consolidated by Standard Oil Co. (N. J.))

CAPITAL STRUCTURE

FUNDED DEBT

1. Deb. 2 1/2% ser. to 1959 & 3s, 1969
2. Deb. 3 1/2% ser. 1954-65 & 1975

CAPITAL STOCK

Issue

1. Common

11 New York. 11 Range in New York since 1936. 11 Sold in Jan., 1955. 11 3s, 1969 (in Canadian funds). 11 Range (in Canadian funds), since 1950 for 3s, 1969. 11 Applies to 3s, 1969. 11 Applies to 2 1/2s, 1975

HISTORY

Incorporated September 8th, 1930, in Canada as the Imperial Oil Co.; name changed to present title by Supplementary Letters Patent September 15th, 1935.

In June, 1948 sold interest in International Petroleum Co., Ltd. to stockholders for \$80,000,000 (see under "Rights").

On Jan. 17, 1949, sold interest in Royalty Oil Co., Ltd. for approximately \$15,000,000.

In Nov., 1949, sold interest in Foothills Oil & Gas Co. and Lavery Petroleum Ltd.

BUSINESS AND PROPERTIES

Refineries: Operates refineries at Ioco, near Vancouver, B. C.; at Regina, Sask.; at Sarnia, Ont.; at Montreal East, Que.; at Halifax, N. S.; at Norman Wells, Northwest Territories; at Calgary and Edmonton, Alberta and Winnipeg, Man., with an aggregate daily potential capacity of 248,450 bbls. Upon completion of expansion projects under construction in 1955, capacity of refineries will be 271,000 bbls.

Daily average throughput (bbls.):

1954	214,383	1950	170,500
1953	204,320	1949	148,545
1952	191,000	1948	134,027
1951	184,523	1947	117,000

Crude runs to stills (M bbls.):

1954	78,250	1951	67,350
1953	74,577	1950	62,215
1952	70,057		

Of the above from Canadian fields: 1954, 63%; 1953, 56%; 1952, 50%; 1951, 44%; 1950, 28%.

Marketing: The company operates throughout Canada. Has large storage plants throughout Canada for distribution of its product.

Product sales (thousand bbls.):

1954	79,500	1950	63,214
1953	77,462	1949	58,062
1952	75,690	1948	51,984
1951	71,777		

Transportation: As of Dec. 31, 1954, wholly-owned subsidiary Imperial Oil Shipping Co., Ltd., owned 3 ocean-going vessels of 59,490 d.w. tons and 139,400 d.w. tons were under charter. Ocean fleet has been operated by Imperial Oil Shipping Co., Ltd., since Jan. 1, 1948.

Total movements for company (M bbls.):

1954	58,032	1952	52,280
1953	54,500		

Company's Marine Department had a fleet of 13 owned vessels at Dec. 31, 1954 and had on charter one other vessel.

The product movement in 1954 on the Great Lakes was 24,243,673 (1953, 44,600,000) bbls. of which the Marine Department's owned vessels moved about 76%.

In 1953, balance of all standard gauge tank cars were sold. Since then all rail movements are handled by over 6,400 leased tank cars.

Crude oil and products moved (M bbls.):

1954	37,593	1952	37,337
1953	36,404		

Pipe Lines: At Dec. 31, 1954, company's subsidiary, Imperial Pipe Line Co., had 309 miles crude oil gathering system in Alberta. The Leduc area system comprises 215 miles, the Redwater field 80 miles and the Excelior field 14 miles.

Oil receipts (M bbls.):

1954	49,417	1951	36,084
1953	47,488	1950	20,243
1952	43,879		

Of the 1954 volume transported, approximately 64% was company production.

In June, 1950, Winnipeg Pipe Line Co., Ltd., was organized as a wholly-owned subsidiary to move Alberta crude from the Interprovincial Pipe Line station at Gretna to Winnipeg area. The line is 77 miles long and was completed in fall of 1950.

Transported (M bbls.):

1954	5,942	1952	5,255
1953	5,367	1951	3,800

INCOME ACCOUNTS

Gross income	\$811,427,361	1953	\$603,296,277	1952	\$549,323,757	1951	\$503,081,103	1950	\$450,784,646	1949	\$352,134,592
Cost of crude & prod., incl. freight	321,486,175		324,872,691		299,803,309		283,836,913		237,753,375		228,557,188
Exploration, oper. & admin. expense	147,587,165		145,345,281		194,921,314		115,509,867		93,241,134		87,359,706
Depreciation, depletion, etc.	29,753,859		23,909,575		18,126,803		15,980,059		15,286,188		15,442,274
General taxes	26,571,875		26,855,413		24,649,772		22,009,080		17,709,420		20,278,368
Net earnings	85,928,304		82,253,314		72,022,258		65,838,174		46,762,521		30,501,926
Misc. income	3,122,232		2,207,998		2,208,680		1,725,852		1,730,959		3,769,304
Total income	89,050,536		84,461,312		74,231,949		67,564,026		48,493,480		34,271,230
Interest and discount	2,567,919		2,069,889		2,512,841		2,604,933		2,723,127		1,863,553
Stock rights expense							432,336				
Income taxes	36,900,032		33,890,911		30,522,609		28,575,804		15,310,786		7,493,132
Net profit	49,582,585		47,984,515		41,196,499		35,951,189		30,460,567		24,114,543

for supplying the western and central Ontario markets from the Sarnia refinery was completed. This line which serves the London, Hamilton and Toronto areas consists of 188 miles of 10 inch and 12 inch main line and a double six inch spur line approximately seven miles long from Waterdown to Hamilton. Initial one-station capacity when pumping to all terminals is 40,000 to 46,000 bbls. daily for fuel oils and gasolines respectively. Ultimate capacity with additional pumping equipment at Sarnia and a second station at London is estimated at 55,000 for fuel oils and 70,000 for gasolines. The line began deliveries to London in April, 1952 to Hamilton in Oct., 1952 and to Toronto in Nov., 1952.

Total deliveries of gasolines, stove oil, furnace oil and diesel oil to those points (M bbls.):

1954	13,228	1952	2,559
1953	11,635		

Line formerly operated by Transit & Storage Co., a wholly owned subsidiary, was sold in Nov., 1953.

Company has acquired a minority interest in Interprovincial Pipe Line Co. (see Moody's Transportation Manual), which operates a 1,772-mile line from Edmonton, Alta. to Sarnia, Ont. The line was completed to Superior, Wis. in fall of 1950 and movement of Alberta oil to Ontario via the line to Superior and tanker to lower lake ports began in spring of 1951. In fall of 1953 the extension of line from Superior, Wis. to Sarnia, Ont. was completed.

Company also has minority interest in Trans Mountain Pipe Line Co. (see Moody's Transportation Manual) which operated a 718 mile pipe line from Edmonton to Vancouver. Line was placed in operation in Oct., 1953.

Production and Exploration: At Dec. 31, 1954, company held petroleum and natural gas rights by means of reservations, options and leases were about 25 million gross acres. They were distributed throughout the western provinces, the Northwest Territories, southwestern Ontario and southern Quebec. Land holdings in the Northwest Territories were substantially reduced.

In 1947 company discovered the Leduc Field in Alberta and subsequently discovered several other important fields such as Woodend, Redwater, Golden Spike, Simmons, Bon Accord, Whitmud, Normanville and Excelior.

Development drilling was completed in 1954 in the Leduc-Woodend field in Alberta and in Smiley field in Saskatchewan. Oil and gas wells were also drilled, either by company or in partnership with others, in 25 oil and gas fields of western Canada.

The more important areas in which development drilling was carried on were in the Joffre, Joffre and Big Valley fields of Alberta, the Borek field of Saskatchewan and the Virden-Rosston field of Manitoba. Towards the end of 1954, company commenced development drilling in the Buck Creek area, which is easterly extension of Pembina field, and in new discovery areas in southeastern Saskatchewan.

Pressure maintenance project at Golden Spike was completed and put into operation in 1954. This plant is capable of injecting up to 14,000 Mol of gas per day into Golden Spike reservoir and will substantially increase ultimate recovery from the pool as well as increasing the allowable daily rate of oil production. The gas can be withdrawn in the future. Company also successfully conducted a pilot pressure maintenance programme in the Leduc D-2 pool by means of water injection.

At end of 1954 potential crude oil production at efficient rates was approximately 146,000 bbls. per day. This was a slightly higher rate of increase than in preceding two years.

Average production rate for 1954 was 66% of its year-end potential, compared to 71% in 1953.

Exploration programme was continued with headquarters at Peace River, Edmonton, Calgary, Regina and London. Survey crews operated in Alberta, Saskatchewan, Manitoba, British Columbia and the Northwest Territories in the West and in southwestern Ontario, and also in the St. Lawrence lowlands in eastern Canada. Seismic surveys continued to be the principal exploration method, but surface and sub-surface geological work was increased. Extensive exploratory drilling was carried out in Alberta, Saskatchewan, Manitoba, Northwest Territories and Ontario. In western Canada 71 wells were drilled and 47 relatively shallow exploratory wells were drilled in Ontario. Six unsuccessful wells adjoining the Pembina field in west-central Alberta. Although this drilling failed to extend the Pembina field to the northwest, some oil shows were encountered in Belly River and Rundle formations.

Of 139 development wells drilled by the company in western Canada in 1954, 118 were completed as oil producers, 7 gas wells and 14 were dry holes. In Ontario 19 wells were drilled, resulting in one oil well, 13 gas wells and 5 dry holes. At Dec. 31, 1954 company had 1,736 oil wells and 133 gas wells.

Net production of crude oil (bbls.):

1954	Total	Aver.
1954	30,828,296	83,654
1953	23,408,213	78,000
1952	23,916,087	85,000
1951	26,001,124	85,000
1950	11,385,716	33,000
1949	Not stated	22,235
1948	Not stated	10,317

Crude oil and product imports (bbls.): 1954, not stated; 1953, 44,040,839; 1952, 46,358,196.

In 1954, company had a net share of 587,168 (1953, 537,482) bbls. of natural gas liquids which were extracted at Devon gas conservation plant and company sold 15.6 (1953, 11.5) billion cu. ft. of natural gas.

Capital Expenditures: For properties and expansion of plant and equipment facilities in 1954 were as follows: Crude oil producing facilities, excluding exploration expenses, \$25,431,213; refining facilities, \$26,957,645; marketing facilities, \$18,035,519; transportation facilities, \$1,659,440; miscellaneous, \$2,151,713; total, \$74,235,530.

SUBSIDIARIES

See under Standard Oil Co. (N. J.).

MANAGEMENT

Officers:

G. L. Stewart, Chairman
J. R. White, President
W. O. Twiss, Vice-President
F. C. Hall, Vice-President
F. K. Jamieson, Vice-President
T. F. Moore, Vice-President
W. D. C. MacKenzie
Colin D. Crichton, General Secretary
J. H. Spence, Comptroller
D. W. McGibbon, Treasurer
J. F. Barrett, General Counsel

Directors:

C. E. Carson
G. L. Stewart
J. R. White
W. O. Twiss
T. F. Moore
W. D. C. MacKenzie
J. W. Hamilton
J. K. Jamieson
E. S. Neal
G. L. Macpherson

Annual Meeting: At call of board.

Auditors: Price Waterhouse & Co.

No. of Stockholders: Dec. 31, 1954 (registered shares), 44,731 of which 37,000 Canadians.

No. of Employees: Dec. 31, 1954, 13,370.

Executive Office: 55 Church St., Toronto.

Registered Office: Sarnia, Ont.

CONSOLIDATED INCOME ACCOUNT, YEARS ENDED DEC. 31

	1954	1953	1952	1951	1950	1949
Gross income	\$811,427,361	\$603,296,277	\$549,323,757	\$503,081,103	\$450,784,646	\$352,134,592
Cost of crude & prod., incl. freight	321,486,175	324,872,691	299,803,309	283,836,913	237,753,375	228,557,188
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General taxes	26,571,875	26,855,413	24,649,772	22,009,080	17,709,420	20,278,368
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Interest and discount	2,567,919	2,069,889	2,512,841	2,604,933	2,723,127	1,863,553
Stock rights expense				432,336		
Income taxes	36,900,032	33,890,911	30,522,609	28,575,804	15,310,786	7,493,132
Net profit	49,582,585	47,984,515	41,196,499	35,951,189	30,460,567	24,114,543

EXHIBIT 12

October 9, 1943

The Goodyear Tire & Rubber Company
Akron 16, Ohio

Attention of Mr. J. E. Long, Manager
General Accounting Department

Gentlemen:

In reply to your letter of August 20, I wish to advise that no "Amines" were used in the manufacture of "Rubber Substitute" during the period June 15, 1942, through June 30, 1943. Our plant has not yet been completed, consequently not only have we used none of this material but up to June 30, 1943, none of it had been purchased.

I note that you addressed your letter to this company as "Agent for Rubber Reserve Company". May I call your attention to the fact that in our contract with Rubber Reserve Company, Humble Oil & Refining Company is not in the legal position of "Agent" for Rubber Reserve Company but rather in the legal position of "Vendor". Hence, any steps we take are those of an independent contractor and not as an agent for Rubber Reserve Company.

Yours very truly

Hines E. Baker

By H.D. Wilde

HDW:em

bcc: HHB
HWF
ELF
CI
CEC

HIGHLY CONFIDENTIAL

STDNJ-010-0844

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